**School District of the City of Niagara Falls, New York**

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**TO: Parents**
**FROM: Mark R. Laurrie, Superintendent**
**RE: Continuous Learning Options for Students**
**DATE: March 24, 2020**

District staff prepared the enclosed materials for parents and students to use during this prolonged school closure event. This work is for reinforcement and practice only, and includes both assignments for students to complete in hard copy, and a menu of District online learning tools accessible from home. The website and software chart is also posted on the District's COVID-19 Crisis Channel under *Parent and Student Resources*. These packets are generic by grade level, and may be used to supplement other at home activities, such as reading aloud and playing games with your child, as well as in addition to individual suggestions or assignments sent to families and students from their home schools. Students are encouraged, to complete the activities herein and to use the online learning tools appropriate for their grade level several times per week.

## Directions:

*There are six reading passages with corresponding questions included in this packet. We recommend having your child try to complete at least two passages a week. Feel free to use additional paper if needed when answering the short response questions.

*A calendar book log has also been included in this packet. Your child can record the title of the book read in the appropriate day's box and the # of minutes read in the space provided. Please encourage your child to read for at least 20 minutes daily.

*Enclosed are six writing prompts. Your child should continue to practice writing in the various genres. Specific details on what should be included are on each page.

My _____ Reading Log

(Month and Year)

| Sunday | Monday | Tuesday | Wednesday | Thursday | Friday | Saturday |
|---|---|---|---|---|---|---|
| ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |

| | **My Goal** | **Minutes Read** | **Parent Initials** |
|---|---|---|---|
| Week 1 | | | |
| Week 2 | | | |
| Week 3 | | | |
| Week 4 | | | |

Name _____

Name _____ Date _____

## Expository Essay Writing Prompt

Expository essays are often called how-to essays. They usually teach the reader something or provide facts about a particular topic.

**Explain three of the best steps kids can take to be safe online**

Name _____ Date _____

## Expository Essay Writing Prompt

Expository essays are often called how-to essays. They usually teach the reader something or provide facts about a particular topic.

**Write an essay to a 5th grade student explaining two or three key strategies for having a positive 6th-grade experience.**

Name _____ Date _____

## Persuasive Essay Writing Prompt

Persuasive essays are those written to convince another person to agree with the writer or take action.

**Advertising can have a powerful impact on consumers. What is a product that you've seen advertised that you don't think should be? Explain why the media should quit showing these ads.**

Name _____ Date _____

## Persuasive Essay Writing Prompt

Persuasive essays are those written to convince another person to agree with the writer or take action.

**What is your favorite book of all time? Write an essay convincing a producer to make a movie about it.**

Name _____ Date _____

## Narrative Essay Writing Prompt

Narrative essays tell a story based on a student's personal experience. They encourage students to use descriptive writing to reflect on their experiences, explain them in a logical manner, and draw conclusions from them.

**Have you thought about what you want to be when you grow up? Write an essay explaining why you think you'd like that career.**

Name _____ Date _____

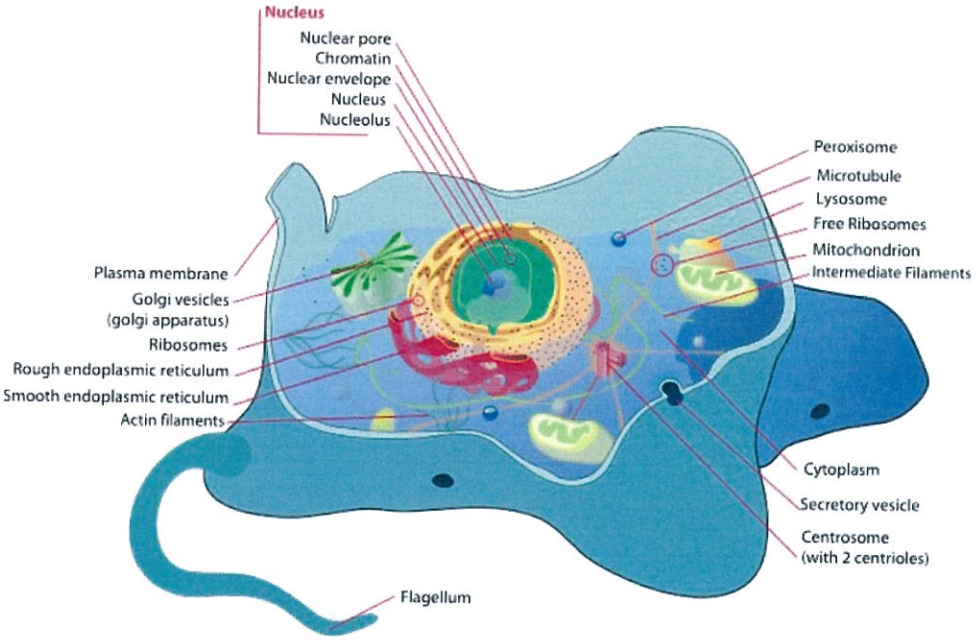
## Narrative Essay Writing Prompt

Narrative essays tell a story based on a student's personal experience. They encourage students to use descriptive writing to reflect on their experiences, explain them in a logical manner, and draw conclusions from them.

**This is your last year of elementary school. What are you most excited or most nervous about when you think of starting middle school?**

# The Cells That Make Us

by ReadWorks




"Mom, I'm hurt," said Mike.

"What happened?" asked Mike's mom.

"I stumbled and fell while playing football at the playground today. I scraped my knee," said Mike.

"You poor dear. Here, let's put a Band-Aid on your knee," said his mom.

Mike's mom gingerly wiped his bleeding knee with a wet cloth and pasted a Band-Aid on it. Mike wondered aloud, "Our bodies are made of arms and legs. The arms and legs are made of blood and bones. But what are these blood and bones made of?"

Mike's mom replied, "Everything in our body is made of small units called cells. Think of it this way. Just like hundreds of thousands of bricks form a house, millions of cells form our muscles, bones, skin, and hair-eventually coming together to form the human body."

As Mike looked at his bandaged knee, he wondered, "Wow, can I see these cells?"

"You cannot see most of your cells with the naked eye," said his mom. "A cell is small. A cell is the smallest unit that can be said to be alive. You can see a lot of cells through a microscope."

"So, every part of my body consists of cells?" Mike said.

"Yeah. Not just your body, mine too," said Mike's mom. "Your pet dog, Tommy? He's made of cells. Your friend Jim's cat? She's made of cells, too. The lions we saw on safari last year, the spiders in our

storeroom. Every creature on Earth is made of cells, just like you and me."

"Wow, so an ant or an amoeba is built up of cells, like Lego blocks?"

"The ant, yes, sort of like Lego blocks. But some creatures have just a single cell, like an amoeba. They are called unicellular organisms. Other creatures, like us human beings, are collections of cells. These are called multicellular organisms. Multicellular organisms can range in size from brown algae to large animals like elephants and whales, which have trillions of cells."

"But what does a cell look like?"

"A cell consists of different parts."

"Like what?"

"So you know how you have different parts of your body that are responsible for different activities? For example, your legs help you move, your stomach helps you in digestion, and your eyes help you see. Well, different parts within cells are responsible for different functions. These different parts perform the activities that keep the cell alive."

"Wow, so how does a cell stay alive?"

"The different parts of the cell work together to keep the cell alive. Many cells have a nucleus. The nucleus is the 'brain' of the cell. It controls and coordinates all activities of the cell. The nucleus is surrounded by the nuclear membrane, which helps to protect the nucleus. In addition to the nucleus, many cells have some other parts. All the parts of the cell are contained within a cell membrane. This is the outer covering of the cell. The cell membrane can allow certain substances, like nutrients and water, to enter the cell. It also can let out waste and even block out some unwanted substances."

"It's so cool that the cell membrane can let in some things and block other things."

"Yeah. Then, between the nucleus and the cell membrane, there is the cytoplasm, which is a gel-like fluid that fills the area. And some other parts of the cell are located in the cytoplasm. Like the nucleus and cell membrane, each part has structure and function."

"Wow. Cells are like machines! What powers them?"

"Energy production usually happens in a part of the cell called the mitochondrion. Not all cells have mitochondria, but a lot of cells do. Mitochondria are usually round or oval-shaped. Sometimes they are shaped like kidney beans. Mitochondria convert food into chemical energy for the cells."

"Do we use this energy, too?"

"Absolutely. The accumulated energy in a lot of the trillions of cells in the average human body help to give us energy. It helps us have the strength to move our arms and legs, to think, and to live."

"Wow. So the cells work together?"

"Yeah. A group of human cells band together and form a tissue. There are four main types of tissue in humans. Connective tissues include blood or bones. These form connections between structures in the body. Muscle tissues form muscles, which help us move. Nervous tissues are in the brain, spinal

cord, and nerves. This type of tissue helps to control many body activities. Epithelial tissues are tissues that line or cover the different parts of the body. This type of tissue has various functions, such as protecting and filtering."

"So many cells make up different types of tissues, and the tissues have different functions in our body?"

"Exactly! The tissues are specialized for different functions, so the cells of one type of tissue work together in unison. For instance, all the cells in the muscle tissue in your calf muscles work together to help you walk or run."

"And the tissues in my biceps help me wave my hand," said Mike, waving his hand from side to side.

"That's not all," said Mike's mom. "Various types of tissue in your body team up to make an organ. Organs perform specific functions in your body. For example, your heart is made of all four types of tissue. All of the tissues in your heart work together to pump blood through your body. The heart is one of five vital organs in humans. The other vital organs are the brain, kidneys, liver, and lungs."

"So these organs are important in keeping me alive?" asked Mike.

"Yeah, and each organ performs its specific function because of the tissues that constitute it."

"And the tissues are formed by cells! That is so cool!"

"That's right. Just about everything a person does is thanks to the teams of cells that make up the tissues that make up the organs!"

"Wow! Unlike a football team competing against other teams, all the teams in the human body work together. That is amazing!"

Name: _____ Date: _____

**1.** According to Mike's mom, what is a cell?

A. a multicellular organism

B. the smallest unit of life

C. a type of tissue

D. a gel-like fluid

**2.** How does Mike's mom compare the cell membrane and the nuclear membrane?

A. Both the cell membrane and nuclear membrane are coverings.

B. Both the cell membrane and the nuclear membrane controls the cell's activities.

C. Both the cell membrane and the nuclear membrane let out waste.

D. Both the cell membrane and the nuclear membrane allow substances to enter the cell.

**3.** Read the following sentences from the text.

"But some creatures have just a single cell, like an amoeba. They are called unicellular organisms. Other creatures, like us human beings, are collections of cells. These are called multicellular organisms. Multicellular organisms can range in size from brown algae to large animals like elephants and whales, which have trillions of cells."

What can be concluded about cells based on this information?

A. Unicellular organisms were once part of collections of cells.

B. Cells in multicellular organisms are stronger than unicellular organisms.

C. Cells can only support life if they are part of a multicellular organism.

D. Some cells can support life independently. Other cells support life collectively.

**4.** Read the following sentences from the text.

> "A group of human cells band together and form a tissue. There are four main types of tissue in humans. Connective tissues include blood or bones. These form connections between structures in the body. Muscle tissues form muscles, which help us move. Nervous tissues are in the brain, spinal cord, and nerves. This type of tissue helps to control many body activities. Epithelial tissues are tissues that line or cover the different parts of the body. This type of tissue has various functions, such as protecting and filtering."

Based on this information, what can you conclude about tissues?

A. All tissues in the body have similar functions.

B. All tissues band together to form cells.

C. Each type of tissue has a different function.

D. Some tissues are more important than others.

**5.** What is this text mostly about?

A. how the parts of cells, tissues, and organs work together

B. the importance of mitochondria in the life of a human being

C. how tissues are made from groups of cells to serve different functions

D. the differences between unicellular and multicellular organisms

**6.** Read the following sentences from the text.

> "That's not all," said Mike's mom. "The organs in your body are made of various tissues. For example, your heart is made of all four types of tissue. All of the tissues in your heart work together to pump blood through your body. The heart is one of five vital organs in humans. The other vital organs are the brain, kidneys, liver, and lungs."
>
> "So these organs are important in keeping me alive?" asked Mike.
>
> "Yeah, and each organ performs its specific function because of the tissues that constitute it."

As used in this sentence, what does the word "constitute" most nearly mean?

A. take away from something
B. give something energy
C. make up the parts of something
D. change in shape or size

**7.** Choose the answer that best completes the sentence below.

_____ one type of tissue in the heart by itself cannot pump blood through the body, a collection of the four types of tissue in the heart can work together as an organ to pump blood.

A. Thus
B. Although
C. Above all
D. For instance

**8.** What is an organ made of?

**9.** Why are all the different parts of the cell necessary?

**10.** Explain how different parts of a human being work together in unison. Use evidence from the text to support your answer.

# Wired World

## A new report shows more people are online than ever before.

"Everyone who uses the Internet, please stand up!" If that message could be heard all over the world at the same time, how many people do you think would stand up?

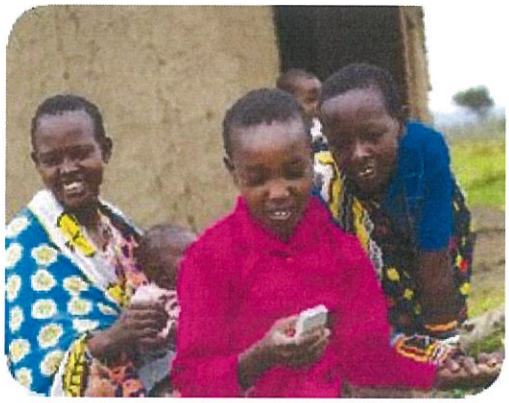
AFP/Getty Images

*Kids in China learn how to use the Internet.*

The answer is almost two billion, or nearly one-third of all human beings on the planet. That number comes from the International Telecommunication Union (ITU). Since 2005, the number of people who have **access** to the Internet through cell phones or computer use has doubled. To have access to something is to have the ability to use it. The Internet is a communications system that connects computers around the world.

### Countries in the Lead

A growing percentage of the world's Internet users access the Internet not through their computers, but with their cell phones. According to ITU, there were an estimated 5.9 billion cell phone subscriptions in 2011. Mobile phone networks are now available to 90 percent of the world's population.



J. Carrier/Getty Images

*In Kenya, cell phones are growing in popularity with schoolchildren.*

J. Carrier/Getty Images- ***In Kenya, cell phones are growing in popularity with schoolchildren.***

The wealthier nations of the world have the most people using the Internet. Poorer nations have the fewest Internet users. The biggest difference in Internet use between the richest nations and the poorest nations is called the global digital divide. However, the digital divide is getting smaller. Of the 226 million new Internet users added in 2010, , most (162 million) came from the world's poorer countries.

Who are the digital leaders? Sweden comes in at number one. The country is followed by Luxembourg, South Korea, Denmark, the Netherlands, Iceland, Switzerland, and Japan. The United States comes in at 19.

## Kids Surf

How has this **rapid**, or quick, growth in Internet use affected young people around the world?

Toshie Takahashi, a professor who specializes in how young people relate to the Internet, spoke to *WR News.*

"Kids can ... communicate with each other using the Internet. ... National boundaries are no **barrier**." A barrier is something that blocks something else. Takahashi says there are some kids who have mixed feelings about the Internet. "It is good in that they can easily make friends, play games, and do other things with kids even on the other side of the globe. But the Internet can be harmful, they say, because it leaves them open to cyberbullying and other harmful things. In general, though, for kids, the Internet has shrunk the world. It does not seem like such a big place anymore."

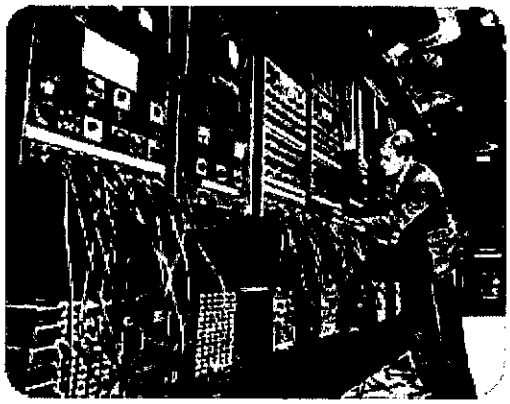
Takahashi thinks that increasing Internet use has led to a better understanding between young people worldwide. "Kids all over the world love American pop music and pop culture," she says. "And an increasing number of American kids are ... learning about pop culture in other countries. I interviewed a U.S. teen who is **fascinated** with Japanese animation, for instance." To be fascinated is to be excited about something or someone.

Takahashi says that, especially in Asia, more kids use cell phones to access the Internet than

computers. "In China, for instance, they don't have a lot of public access to the Internet, but they have a huge number of cell phones capable of downloading a lot of data quickly. In Japan, ... students research and write papers using their cell phones alone!"

## Who Invented the Internet?

U.S. Department of Defense members were the first world's "Webmasters."



akg-Images/Newscom

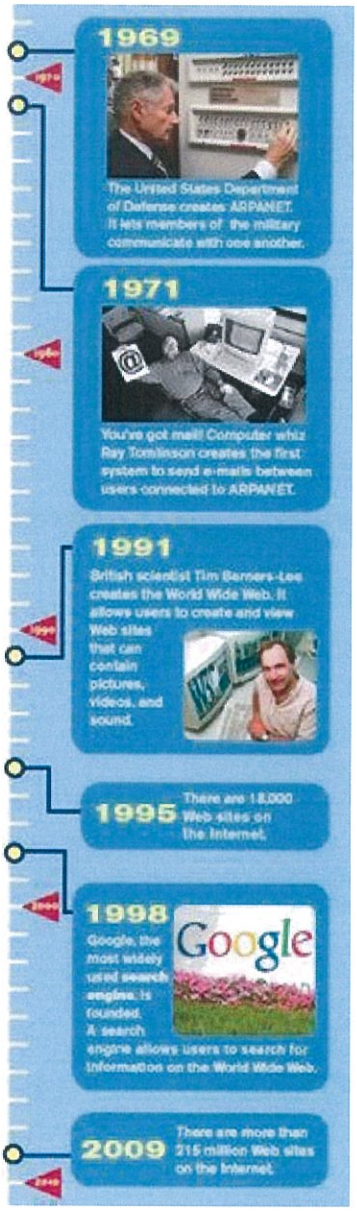
*This early computer isn't exactly a lap top! It was built in 1945 at the University of Pennsylvania.*

The department created the Advanced Research Projects Agency Network (ARPANET). That was a network of university and U.S. military computers. ARPANET machines could share information and "talk" to one another. By 1981, approximately 200 computers were on the network.

After the World Wide Web was created in 1991, ARPANET and other networks joined to form what we know today as the Internet.

## America, Online

Ever wonder how the Internet works? Browse through the time line to learn about some major moments in the Internet's history.




1969: AFP/Newscom; 1971: Ed Quinn/Corbis; 1991, 1998: AP Images

**Name:** _____ **Date:** _____

**1.** According to the passage, which of the following countries comes first on the list of digital leaders?

A. South Korea

B. Luxembourg

C. United States

D. Sweden

**2.** The passage describes Internet use around the world. How many people around the world use the Internet?

A. about one-half of all humans

B. about 200,000 humans

C. about one-third of all humans

D. about 3 million people

**3.** Based on the passage, why do the wealthier nations most likely have the most people using the Internet?

A. Wealthier nations offer the Internet for free to people.

B. Wealthier people can afford to buy the technology to access the Internet.

C. It is cheaper in wealthier nations to access the Internet.

D. People in poorer nations do not like to use the Internet.

**4.** Read the following sentence:

"Kids can ... **communicate** with each other using the Internet. ... National boundaries are no barrier."

As used in the passage, what does "**communicate**" mean?

A. see

B. travel

C. talk

D. ignore

**5.** What is the central idea of this passage?

A. the Internet can be accessed from anywhere in the world

B. how to fix the digital divide

C. the Internet is used by many people around the world

D. how the idea of the Internet was created

**6.** What is the global digital divide?

_____

_____

_____

**7.** Based on the passage, what does Toshie Takahashi most likely mean when she says that the Internet has shrunk the world?

_____

_____

_____

**8.** Choose the word that best completes the sentence.

Students in Asia use their cell phones to research and write papers _____ there isn't a lot of public access to the Internet in those countries.

A. after

B. but

C. because

D. so

# Arachne the Weaver

by ReadWorks

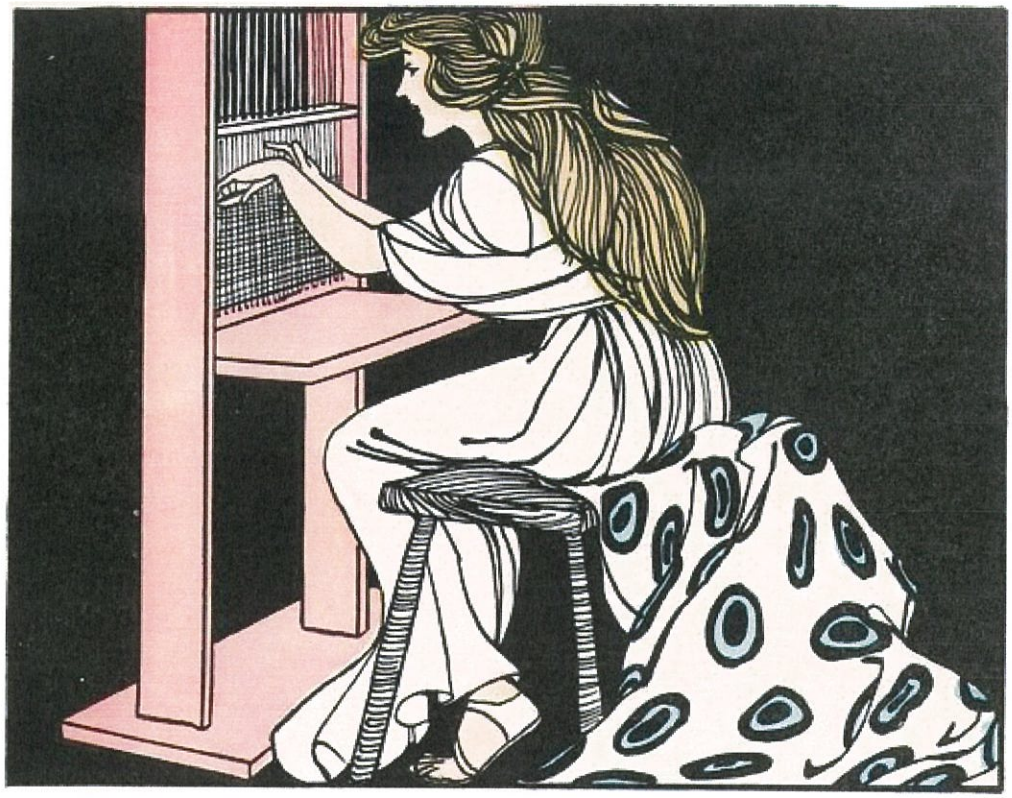


*illustration of Arachne*

It may seem difficult to take Greek myths seriously. After all, they tell of angry gods, dueling goddesses, snake-haired women, and beasts consisting of both animal and human parts. But mythology was a significant influencing factor in the day-to-day lives of the people of ancient Greece. They didn't have televisions or the Internet. There was no Google then, no encyclopedias, and no way to look some piece of information up quickly and learn it. Instead, the ancient Greeks turned to stories and legends to understand how the world around them operated. They used myths to explain the things they didn't understand, like thunder and earthquakes. And they used myths to make scary things seem less frightening. Over time, myths changed, and their events and details varied from one telling to the next, but their narrative outcomes remained largely the same.

Mythology, in the time of ancient Greece, was used not only to explain various phenomena that we now understand via scientific truths, but to account for the origins of humankind. It answered questions like, "What happens after death?" and, "Why does humanity exist at all?" Myths were also often entertaining, and sometimes humorous and intriguing; remember that there weren't TV episodes or movies in ancient Greece, so people had to entertain themselves in other ways. But more than that, myths told people how to live, and how to tell right from wrong. These stories included morals intended to teach valuable life lessons and instill ethics in their readers.

Take, for instance, the story of Arachne. Arachne was a young girl famed in her region for her spinning and weaving. Her cloth was said to be the softest and fairest of any in the land-so fine that

some believed it to be spun from gold. Because of her skills, Arachne was prideful. She thought herself the best spinner and weaver in the world, and she was certain that no one could match her talents and gifts.

One day, an old woman walked past Arachne weaving on her loom and asked her, "Who taught you to weave so well?"

Arachne replied that she had taught herself, and that she was the best spinner and weaver in the world.

"But perhaps Athena, the goddess of craft and weaving, taught you to spin and weave without your knowing it?"

Arachne, in her vanity, replied, "No, not even Athena is as good as I am."

The old woman then tore away her disguise and revealed herself as Athena. She was enraged that a mortal could be boastful and would dare to compare herself to a goddess. And so, Athena challenged Arachne to a spinning and weaving contest. The rules of the contest were simple: each woman would weave a tapestry, and Zeus, king of the gods, would act as the judge. If Arachne won, Athena would never weave again. And if Athena won, Arachne would never spin or touch a loom for the rest of her life.

Hundreds gathered to watch the two women weave. Arachne wove a cloth from the finest silk. It was said that the cloth was so fine it could barely be felt, but that it had the strength to hold a hundred men. On the cloth, Arachne depicted the failings of the gods, portraits of the gods acting immorally and foolishly.

Athena, on the other hand, is said to have spun with sunbeams, the sky, the fields, and the clouds. She wove a tapestry that showed the gods in all their strength and glory, praising them for their splendor.

It was obvious that Athena's cloth was more spectacular than Arachne's. Even Arachne, upon seeing Athena's tapestry, hid her face in her hands in shame.

In one version of the myth, Athena shredded Arachne's cloth into pieces when she saw how the girl had insulted the gods. But both women knew who the victor was, and Arachne realized that she would never be able to touch a loom again.

Ashamed and devastated at her loss, Arachne attempted to kill herself. Athena, taking pity on Arachne, stopped her. Athena insisted that Arachne remain true to her word and never again spin or touch a loom. Athena then transformed her into a spider so that she could continue to spin and weave beautiful tapestries. All spiders, in Greek mythology, are said to be the children of Arachne.

This particular Greek myth served to warn against the dangers of pride and vanity, as well as caution those seeking to compete against or humiliate the gods.

**Name:** _____ **Date:** _____

**1.** What did the ancient Greeks turn to in order to understand how the world operated?

A. books and encyclopedias

B. gods and goddesses

C. stories and legends

D. rulers and laws

**2.** What does the author describe in the article?

A. the role of mythology in ancient Greece

B. the importance of theater in ancient Greece

C. the origins of humankind according to Greek mythology

D. how ancient Greek myths changed over time

**3.** "[M]ythology was a significant influencing factor in the day-to-day lives of the people of ancient Greece."

What evidence from the text supports this statement?

A. "Myths were [...] sometimes humorous and intriguing[.]"

B. "[M]yths told people how to live, and how to tell right from wrong."

C. "[The ancient Greeks] didn't have televisions or the Internet."

D. "Over time, myths changed, and their events and details varied[...]"

**4.** Based on the story, how can Arachne be described?

A. Humble and kind

B. Clever and generous

C. Talented and insecure

D. Vain and disrespectful

**5.** What is a main message of the story of Arachne?

A. The gods are immoral and foolish.

B. People should keep their talents secret.

C. People should not be vain or prideful.

D. Gods and humans are equally talented.

**6.** Read these sentences from the text.

"On the cloth, Arachne **depicted** the failings of the gods, portraits of the gods acting immorally and foolishly.

"Athena, on the other hand, is said to have spun with sunbeams, the sky, the fields, and the clouds. She wove a tapestry that showed the gods in all their strength and glory, praising them for their splendor."

As used in this sentence, what does "**depicted**" mean?

A. praised

B. showed

C. prayed to

D. warned about

**7.** Choose the answer that best completes the sentence.

Athena challenged Arachne to a spinning and weaving contest _____ she was enraged that Arachne dared to compare herself to a goddess.

A. however

B. although

C. because

D. therefore

**8.** What did Athena do to Arachne at the end of the story?

_____

_____

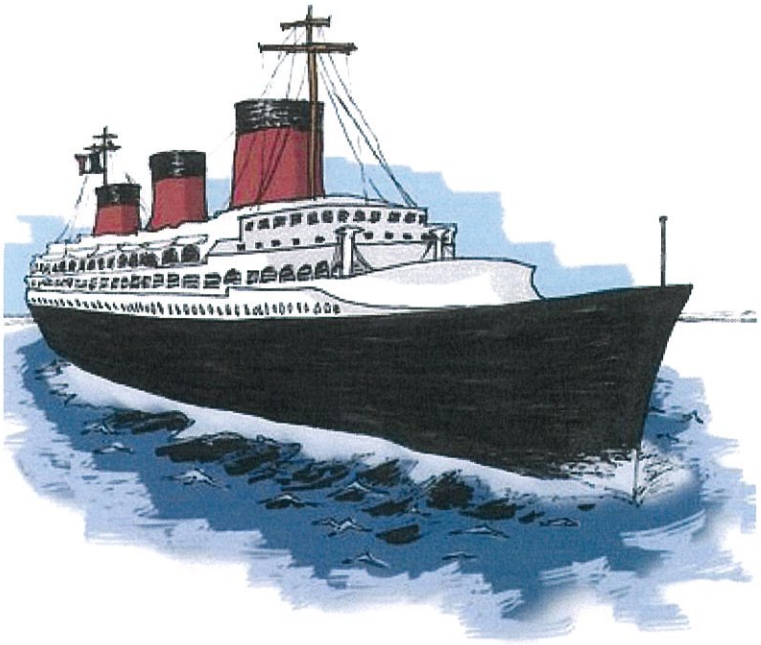
_____

**9.** The text says that the myth of Arachne "served to warn against the dangers of pride and vanity[.]" How does the story of Arachne demonstrate the dangers of pride and vanity? Use details from the story to support your answer.

**10.** Based on the myth of Arachne, how were the ancient Greeks supposed to live their lives? Use evidence from the text to support your answer.

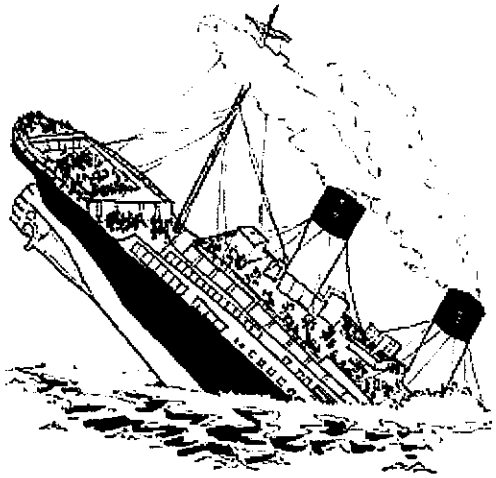
# The SS Normandie

by W.M. Akers
**Illustrations by Nishan Patel**

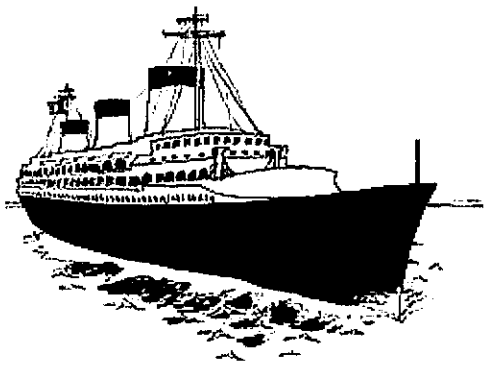


If your family wanted to travel from America to Europe, you might go to the airport and get on a plane. But generations ago, airplanes were less common, and there was only one way to cross the Atlantic Ocean: on the sea.

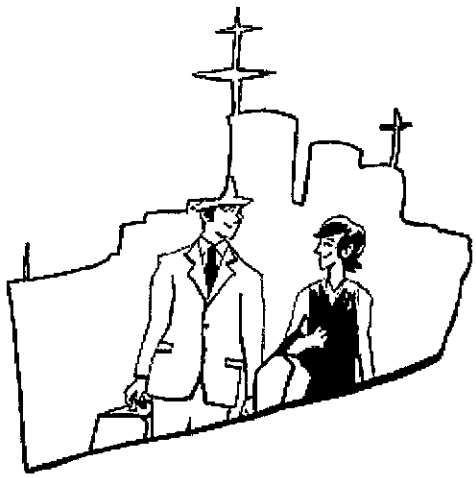
You've probably heard of the RMS *Titanic*, which claimed the lives of more than 1,500 people when it sank in April 1912. But the age of the ocean liners did not end with the *Titanic*. In fact, the great ships only got bigger and faster.



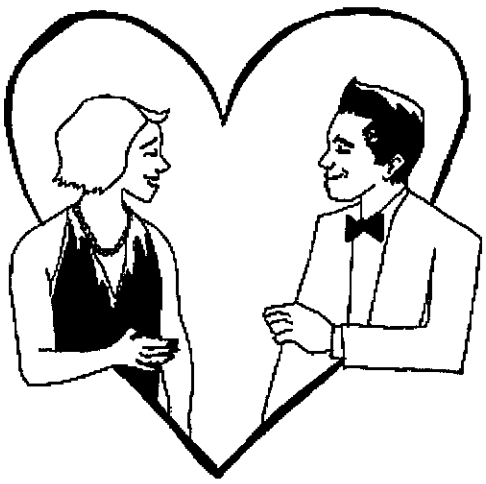
When the SS *Normandie,* a French ocean liner, pulled into New York Harbor on June 3, 1935, she was the largest ship ever built.

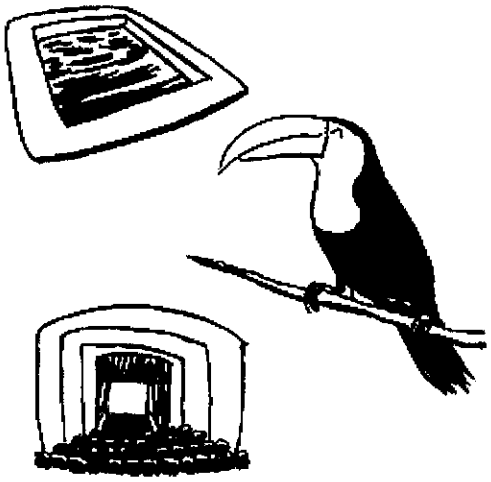


More than twice the size of the *Titanic*, she could accommodate more than 1,500 passengers and 1,300 crew members. She was also the fastest ship in the world. On her maiden voyage, she crossed the Atlantic in just over four days-an incredible speed in a day when air travel was not yet widespread.

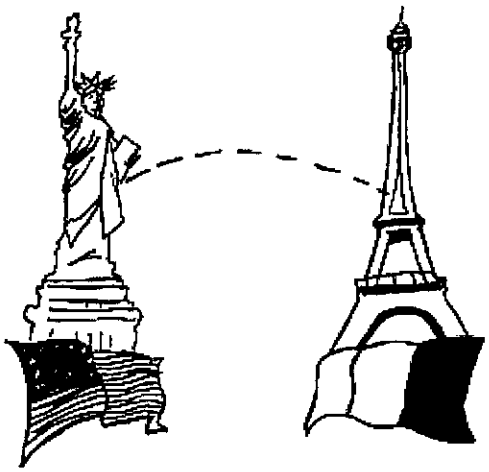


But the *Normandie* was most famous for the luxury of her accommodations. Passengers could swim in the ship's massive swimming pool, admire the exotic birds in the winter garden, and watch plays and movies in the ship's theater. Three-quarters of the ship were dedicated to first-class passengers, who were some of the wealthiest people in the world. At night, they put on formalwear and ate in the 305-foot-long dining room. Each night was a luxurious party.



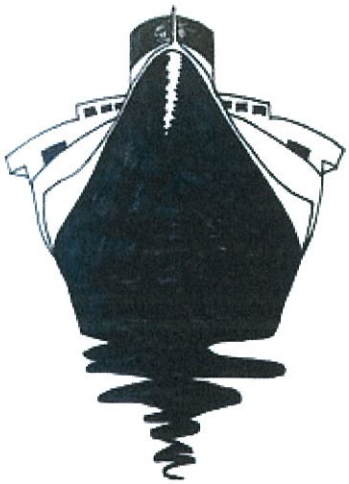


World War II started in 1939, and France was soon conquered by Germany. The *Normandie* was in port in the United States when this happened, and the American government took control of the ship. They did not want such a fast vessel to fall into German hands. They planned to convert the *Normandie* into a troop transport to carry American soldiers overseas, but on February 9, 1942, disaster struck.



Sparks created by one of the workmen landed on a pile of life preservers, which caught fire. The ship's sprinkler system had been turned off, and the fire quickly spread through the ship. Firemen from all over New York came to Pier 88 to try to save the great liner.

For hours they fought the flames, pouring thousands of gallons of water onto the boat, but the fire could not be stopped. The water caused the ship to tilt, and finally it fell over completely. For months the ship lay on its side, frozen in icy mud. Finally the Navy had to tear it apart, piece by piece. Fewer than 10 years after first sailing into New York, the great liner was no more.



**Name:** _____ **Date:** _____

**1.** What was the SS *Normandie*?

A. an airplane

B. an ocean liner

C. a troop transport

D. a battleship

**2.** The text describes the sequence of events that led to the destruction of the SS *Normandie.* What happened after firemen spent hours to fight the fire on the SS *Normandie*?

A. The ship tilted and fell over completely.

B. World War II started.

C. Sparks landed on a pile of life preservers on the ship which caught fire.

D. The American government took over the ship completely.

**3.** The SS *Normandie* was a very fast ship in its time. What evidence from the passage best supports this conclusion?

A. "When the SS*Normandie*, a French ocean liner, pulled into New York Harbor on June 3, 1935, she was the largest ship ever built."

B. "More than twice the size of the Titanic, she could accommodate more than 1,500 passengers and 1,300 crew members."

C. "Three-quarters of the ship were dedicated to first-class passengers, who were some of the wealthiest people in the world."

D. "On her maiden voyage, she crossed the Atlantic in just over four days-an incredible speed in a day when air travel was not yet widespread."

**4.** The SS *Normandie* was the fastest ship of its time. Based on the text, why might the American government not have wanted the Germans to get control of the ship after World War II started?

A. They thought the Germans might use the ship to transport Germany's richest people. They did not want this to happen.

B. They thought the Germans might use it to learn about French culture. They did not want this to happen.

C. They thought the Germans might have a better chance at winning the war if they had control of the ship. They did not want this to happen.

D. They thought the Germans might transport American soldiers overseas. They did not want this to happen.

**5.** What is the main idea of this text?

A. The luxurious SS*Normandie,* the fastest and largest ship of its time, was destroyed by a fire.

B. The American government took control of the SS*Normandie* after World War II began.

C. The SS*Normandie* was most famous for the luxury of its accommodations.

D. A couple of generations ago, travel by sea was far more common than airplanes.

**6.** Read the following sentences: "But the *Normandie* was most famous for the **luxury** of its accommodations. Passengers could swim in the ship's massive swimming pool, admire the exotic birds in the winter garden, and watch plays and movies in the ship's theater."

As used in this sentence, what does the word "**luxury**" mean?

A. something very pleasant and very necessary

B. something very cheap but important

C. something very necessary but not pleasant

D. something very pleasant but not necessary

**7.** Choose the answer that best completes the sentence below.

The American government did not want the *Normandie* to fall into German hands, _____ they took control of the French ship while it was at port in the United States.

A. but

B. so

C. after

D. namely

**8.** What major world event caused the American government to take control of the *Normandie*?

_____

_____

_____

**9.** List two accommodations of the SS *Normandie*.

_____

_____

_____

**10.** Explain why the SS *Normandie* was such a great ship. Use evidence from the text to support your answer.

# Endangered Animals at a Glance

## Back to the Wild

Not all the news is bad about endangered animals. In the United States, dozens of endangered animals have been making a comeback. Here are few of them:

**Gray Wolf:** By the 1970s, the gray wolf had all but vanished from Yellowstone National Park. In 1995 and 1996, federal biologists brought 66 wolves from Canada and set them free in the wilderness areas of the park and central Idaho. Today, about 285 gray wolves live in central Idaho, and 271 more roam Yellowstone.

**Bald Eagle:** Before Europeans came to North America, the sky was teeming with bald eagles. As settlers moved west, they destroyed the eagles' natural habitat. Egg collectors and pesticides almost wiped out the bald eagle population.

However, about 30 years ago the federal government passed laws to protect the eagles. Today, more than 7,678 pairs of bald eagles live in the lower United States.

U.S. Fish and Wildlife Service

*Grizzly Bear*

**Grizzly Bear:** In the 1800s, an estimated 50,000 grizzly bears roamed the West. Today, the bears are making a comeback in several Western areas, including Yellowstone Park.

# Can Zoos Help Save Endangered Animals?

Emi is a crowd-pleasing Sumatran rhinoceros at the Cincinnati Zoo. Why is she so popular? In 2004, Emi gave birth to Suci, a healthy, wide-eyed female calf.

Although most visitors to the zoo enjoy gazing at Emi and Suci, scientists are happy for another reason. Suci's arrival brings scientists a step closer to pulling the Sumatran rhinoceros back from the edge of extinction.

sxc.hu

*Sumatran rhinoceros*

As the populations of wild animals dwindle, conservationists are hoping that they can breed animals in zoos and later release them into the wild.

Scientists have reintroduced at least 19 species to the wild from captivity. For example, by 1985 only nine wild California condors were living in that state. Biologists captured all nine and began a captive breeding program. As of July 2005, the number of condors increased to 280, with more than 120 living in the wild.

**Name:** _____ **Date:** _____

**1.** The passage explains why some endangered animals, including gray wolves and bald eagles may

A. be getting killed at increasing rates

B. be making a comeback

C. be hard to find

D. be living in zoos

**2.** The big problem described in the passage is that many animals at one time were in danger of extinction. The passage also describes the efforts that contributed to solving this problem which include

A. arresting hunters and importing animals from other countries

B. federal laws and breeding animals in captivity

C. breeding animals in captivity and allowing animals to roam freely

D. importing animals from other countries and feeding them special food

**3.** Which of the following conclusions are supported by the passage?

A. Scientists do not want to breed animals in zoos.

B. Endangered animals may no longer survive.

C. Zoos should not help endangered animals.

D. People have been able to find ways to save endangered animals.

**4.** Read the following sentence:

"As the populations of wild animals dwindle, conservationists are hoping that they can breed animals in zoos and later release them into the wild."

In this sentence the word **dwindle** means

A. sickly

B. missing

C. decline

D. raise

**5.** Which statement best describes the main idea of this passage?

A. People are harming endangered animals.

B. Endangered animals need our help.

C. Scientists are trying to find a way to help animals to find safe places to live.

D. Some endangered animals are increasing in number.

**6.** When the gray wolf had nearly vanished, what did people do to help prevent it from becoming extinct?

_____

_____

_____

**7.** Why might conservationists want to breed animals in captivity?

_____

_____

_____

**8.** The question below includes an incomplete sentence. Choose the word that best completes the sentence.

At one time only nine wild California condors were living in that state. _____ May 2012, that number has increased to 405 with about 226 living in the wild.

A. Next

B. Now

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A. Next

B. Now

C. Since

D. When

# Grade 6 Mathematics Continuous Instruction Packet

This packet contains review and practice in three categories.

- Skill review – Basic skills needed for application in Grade 6 content
- Common Core Review – Grade level review in the major domains of Ratio & Proportional Reasoning and Expressions & Equations
- NYS Test Prep

It is recommended that you attempt one activity from each of these categories. For example, one "Skill" activity (Skill #17), one common core review (i.e. 6.RP.1) and a page or two from 2018/2017 Released Questions.

Answers were included where available.

Name _____ Date _____ Class _____

# 6.RP.1

## SELECTED RESPONSE

**Select the correct answer.**

1. A snow blower requires a fuel mixture ratio of 40:1 (gas to oil). Which expression represents this ratio?

   (A) $\frac{40}{1}$

   (B) $1 \times 40$

   (C) $40 \times 1$

   (D) $\frac{1}{40}$

2. A rectangular yard is 10 feet long by 7 feet wide. What is the ratio of the width of the yard to the perimeter of the yard?

   (A) 7 to 17

   (B) 7 to 34

   (C) 17 to 34

   (D) 34 to 7

3. Steve earns $8 per hour. His older brother earns $2 more per hour than Steve. What is the ratio of the money Steve earns in an hour to the money his brother earns in an hour?

   (A) $8 to $2

   (B) $2 to $8

   (C) $10 to $8

   (D) $8 to $10

4. A man mixed 2 teaspoons of sugar into his large coffee but then added one more teaspoon of sugar because it was not sweet enough. What is the ratio of teaspoons of sugar to one large coffee?

   (A) 3:1

   (B) 2:1

   (C) 1:3

   (D) 1:2

**Select all correct answers.**

5. A punch bowl contained 2 liters of ginger ale, 1 liter of orange juice, and 1 liter of raspberry juice. Select all the true statements.

   (A) The ratio of the ginger ale to the entire punch bowl is 1 to 4.

   (B) The ratio of orange juice to ginger ale is 2 to 1.

   (C) The ratio of the juices to the ginger ale is 2 to 2.

   (D) The ratio of the entire punch bowl to the juices is 2 to 4.

   (E) The ratio of the orange juice to the raspberry juice is 1 to 1.

6. A restaurant worker was told to make every ham sandwich with 2 tomato slices and 3 pickle slices. Select all true statements.

   (A) A worker makes three ham sandwiches. Taken together, the sandwiches will have a ratio of total number of tomato slices to total number of pickle slices of 6:9.

   (B) For every ham sandwich, the ratio of tomato slices to pickle slices is 3:2.

   (C) A worker makes five sandwiches. The ratio of total number of tomato slices to total number of pickle slices is 7:8.

   (D) On every ham sandwich, the ratio of tomato slices to pickle slices is 2:3.

   (E) Once a ham sandwich is made, there will be a ratio of 2 tomato slices to 1 ham sandwich.

## CONSTRUCTED RESPONSE

7. In Ken's meatball recipe, for every 5 cups of bread crumbs, 9 pounds of ground beef are used. Write this ratio using a fraction. Label the numbers in the fraction.

Name _____ Date _____ Class _____

8. For every pizza Eric's family ate, Eric ate 2 of the 8 pieces. If Eric's family bought 2 pizzas, write the ratio of the total number of pieces Eric ate to the total number of pieces the family ate.

9. A middle school has the fifth and sixth grades. There are 100 fifth grade boys and 110 fifth grade girls. There are 7 fewer sixth grade boys than fifth grade boys, and there are 10 more sixth grade girls than sixth grade boys What is the ratio of girls to boys in the middle school? Show your work.

10. A particular school has a teacher to student ratio of 1 teacher to 11 students.
    a. Express the teacher to student ratio using the symbol ":".
    b. Express the teacher to student ratio as a fraction.
    c. Are there more teachers or students? Explain how you know.

11. On a package of rice, the directions say that the ratio of cups of water to cups of uncooked rice should be $1:\frac{1}{2}$.
    a. What is the total number of cups of ingredients needed if you want to cook $\frac{1}{2}$ cup of uncooked rice?
    b. Susan says that the ratio of cups of water to total cups of ingredients is 1:2 because there is twice as much water as there is rice. Is this the correct ratio? Explain why or why not, and if not, give the correct ratio.

12. At the end of the season, Erica's basketball team has a win-to-loss ratio of 3:2.
    a. What is the ratio of wins to games played?
    b. Can you use the ratio you found in part a to conclude that the total number of games Erica's team played in one season is 5? Explain why or why not.

Name _____ Date _____ Class_____

# 6.RP.2

## SELECTED RESPONSE

**Select the correct answer.**

1. A 5-pound bag of cat food costs $11.25. What is the unit price of the cat food in dollars per pound?

   (A) $0.44 per pound
   (B) $2.25 per pound
   (C) $6.25 per pound
   (D) $56.25 per pound

2. Three pounds of fish costs $14.97 at the market. What is the unit price of the fish in dollars per pound?

   (A) $4.99
   (B) $11.97
   (C) $14.97
   (D) $44.91

3. Bill drove 315 miles in 7 hours, Alisha drove 235 miles in 5 hours, and Joanne drove 414 miles in 9 hours. Which person drove at an average speed of 47 miles per hour?

   (A) Alisha
   (B) Joanne
   (C) Bill
   (D) Both Joanne and Bill

**Select all correct answers.**

4. For each store, calculate the unit price per ounce of potato chips. Which stores sell potato chips at a unit rate of $0.17 per ounce?

| Potato Chip Prices | | |
|---|---|---|
| **Store** | **Cost** | **Ounces** |
| A | $1.69 | 8 |
| B | $2.99 | 16 |
| C | $3.74 | 20 |
| D | $4.08 | 24 |
| E | $5.44 | 32 |

   (A) Store A
   (B) Store B
   (C) Store C
   (D) Store D
   (E) Store E

5. Which of the rates shown here correspond to a unit rate of $6 per sandwich?

   (A) Spending $42 to buy 7 sandwiches
   (B) Spending $108 to buy 18 sandwiches
   (C) Spending $40 to buy 5 sandwiches
   (D) Spending $100 to buy 16 sandwiches
   (E) Spending $42 to buy 6 sandwiches

**Match each quantity with the correct unit rate.**

____ 6. A 30-ounce bottle of fruit juice costs $4.80.
____ 7. 16 ounces of ground turkey costs $2.40.
____ 8. A 32-ounce bottle of laundry detergent costs $6.72.
____ 9. A 20-ounce bag of potato chips costs $3.80.
____ 10. A 32-ounce bottle of shampoo costs $5.76 per ounce.

**A** $0.15 per ounce
**B** $0.16 per ounce
**C** $0.17 per ounce
**D** $0.18 per ounce
**E** $0.19 per ounce
**F** $0.20 per ounce
**G** $0.21 per ounce
**H** $0.22 per ounce

Name _____ Date _____ Class _____

## CONSTRUCTED RESPONSE

11. A group of 180 students is divided into 20 teams for a competition.

    a. Write a unit rate that represents the number of students on one team.

    _____

    b. Part way through the competition, the students are gathered together and divided into 15 teams. If there are still 180 students in the competition, how many students are on each team now?

    _____

12. A deli sells ham for $2.98 per half pound. Kyle incorrectly says that the unit rate is $1.49 per pound. His calculations are shown below. Explain Kyle's mistake and determine the correct price per pound. Show your work.

$$\frac{\$2.98 \div 2}{\frac{1}{2}\text{ pound} \div 2} = \frac{\$1.49}{1\text{ pound}}$$

13. A grocery store sells Swiss cheese for $5.90 a pound. To the nearest cent, what is the cost per ounce of Swiss cheese? Round your answer to the nearest cent and show your work.

14. Three wholesalers are having special deals on chicken this week. Wholesaler A is selling 10 pounds of chicken for $40.00, wholesaler B is selling 15 pounds of chicken for $45.00, and wholesaler C is selling 20 pounds of chicken for $50. Which wholesaler has the best price on chicken? Show your work.

15. John and Maria are spending the afternoon hiking in the desert. They purchased six bottles of water for $9.00, two protein bars for lunch for $5.00, and some peanuts for $3.00 as a snack. Suppose they start hiking at 11:30 A.M. and finish the hike at 3:45 P.M. What is the unit rate of money spent to hours hiked? Show your work.

Name _____ Date _____ Class _____

# 6.RP.3a

## SELECTED RESPONSE

**Select the correct answer.**

1. Steel alloys are formed by mixing certain ratios of iron, carbon, and possible other elements. The table shows the amount of carbon required to make certain amounts of a particular alloy. Find the missing value for the table.

| Steel (kg) | Carbon (g) |
|---|---|
| 50 | 250 |
| 60 | 300 |
| 70 | |
| 80 | 400 |

Ⓐ 350 g

Ⓑ 280 g

Ⓒ 420 g

Ⓓ 175 g

2. A certain paint color is obtained by mixing the correct ratio of red and blue paints. Every time a batch is made, the mixer records the amounts of each color used. One of the batches in the table below was made incorrectly. Which batch should be rejected?

| Batch | Red (gal) | Blue (gal) |
|---|---|---|
| 1 | 4 | 6 |
| 2 | 2 | 3 |
| 3 | 12 | 24 |
| 4 | 8 | 12 |

Ⓐ Batch 1

Ⓑ Batch 2

Ⓒ Batch 3

Ⓓ Batch 4

3. A cyclist was traveling at a constant speed for 8 hours. The table below shows the distances traveled after various times. At the end of the trip, the cyclist's odometer read 96 miles. Which answer could be the missing row of the table?

| Time (hr) | Distance (mi) |
|---|---|
| 1 | 12 |
| 2 | 24 |
| 3 | 36 |
| 4 | 48 |
| 5 | 60 |
| | |
| 7 | 84 |
| 8 | 96 |

Ⓐ (6, 70)

Ⓑ (6, 74)

Ⓒ (6.5, 78)

Ⓓ (6.5, 80)

4. A student was interested in purchasing notebooks in bulk to get ready for school. Three stores were offering packages of the kind of notebook the student wanted. The table below shows the offers from each store. Order the stores from the best deal to the worst deal for the notebooks.

| Store | Cost | Notebooks |
|---|---|---|
| A | $16.00 | 10 |
| B | $18.00 | 12 |
| C | $27.00 | 15 |

Ⓐ Store B, Store A, Store C

Ⓑ Store A, Store B, Store C

Ⓒ Store B, Store C, Store A

Ⓓ Store C, Store A, Store B

Name _____ Date _____ Class _____

**Select all correct answers.**

5. A music store charges for lessons according to the table below. If the store charges a constant rate of dollars to time, which of the following could fill the empty row?

| Time (min) | Cost |
|---|---|
| 30 | $24 |
| 40 | $32 |
| 45 | $36 |
| | |

a. 50 minutes for $40 ○ Yes ○ No

b. 60 minutes for $42 ○ Yes ○ No

c. 70 minutes for $56 ○ Yes ○ No

d. 90 minutes for $72 ○ Yes ○ No

## CONSTRUCTED RESPONSE

6. An airport mixes an additive into its jet fuel. The ratio of fuel to additive needs to be kept the same. Complete the table below for the amount of additive required for different amounts of fuel.

| Fuel (kg) | 63 | | 84 | 98 | |
|---|---|---|---|---|---|
| Add. (g) | | 30 | | 42 | 48 |

7. An engineer is investigating three engines for fuel efficiency. The table below shows the results of the tests for the three engines. Which option gives the best fuel efficiency? Why?

| Option | Fuel (gal) | Range (mi) |
|---|---|---|
| A | 24 | 528 |
| B | 30 | 690 |
| C | 42 | 840 |

_____

_____

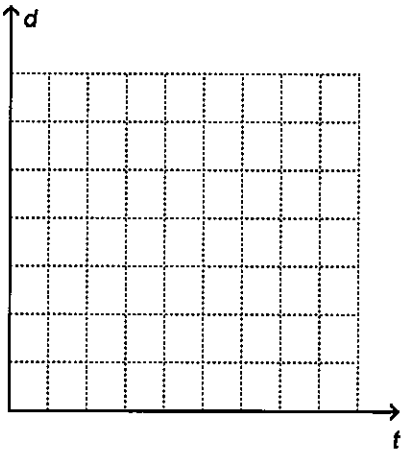
_____

_____

_____

8. A plane was traveling at a constant speed and went 3200 miles in 8 hours. Make a table of four pairs of distance and time. Then use your table to create a graph of distance versus time.

| Distance (mi) | | | | |
|---|---|---|---|---|
| Time (hr) | | | | |




9. A car is being tested for reliability on a track by driving at a constant speed. The car has traveled 150 miles in 3 hours.

a. Complete the table below.

| Distance (mi) | | | 150 | | |
|---|---|---|---|---|---|
| Time (hr) | 1 | 2 | 3 | 4 | 5 |

b. If the car breaks down 4.5 hours into the test and has to stop for a repair before continuing, what ratio(s) of distance to time would be affected?

_____

_____

c. How would you expect the ratio to change? Explain your reasoning.

_____

_____

_____

_____

_____

Name _____ Date _____ Class _____

# 6.RP.3b

## SELECTED RESPONSE

**Select the correct answer.**

1. If 4 gallons of milk cost $16.76, how much would 7 gallons of milk cost?
   - (A) $4.19
   - (B) $29.33
   - (C) $67.04
   - (D) $117.32

2. John drives to the beach, which is 270 miles away. In 2 hours, he drives 120 miles. If he continues at that speed, how long will it take him to get to the beach?
   - (A) 2 hours
   - (B) 2.5 hours
   - (C) 4 hours
   - (D) 4.5 hours

3. The yard care staff can mow 45 lawns in a 10-hour work day. Each of the 9 workers can mow the same number of lawns per hour. How many lawns can one worker mow per hour?
   - (A) 0.5 lawn per hour
   - (B) 0.9 lawn per hour
   - (C) 4.5 lawns per hour
   - (D) 5 lawns per hour

4. A car travels 304 miles on 16 gallons of gas. How far can the car go on 5 gallons?
   - (A) 3.2 miles
   - (B) 60.8 miles
   - (C) 80 miles
   - (D) 95 miles

5. The last time Robert filled up his car with gas, he paid $24.50 for 7 gallons. This time, he needs 15 gallons. If the price is the same, how much will he pay?
   - (A) $52.50
   - (B) $32.50
   - (C) $11.43
   - (D) $3.50

## CONSTRUCTED RESPONSE

6. A moving company has one large truck for furniture and one small truck for boxes. During one move, it took the large truck 4 hours to travel 180 miles. It took the small truck 3 hours to make the same trip.
   a. Assume both trucks traveled at constant speeds. How fast did each truck travel?

   b. The following week, the company was hired for a 225-mile move. If each truck traveled at the same speed it had the previous week, how long did the trip take for each truck?

7. Two shoppers bought meat at a supermarket deli. The first bought 3 pounds of meat for $9.87. The second bought 4 pounds of meat for $16.76. Neither of the shoppers had a coupon or a discount card. Can you tell if both shoppers bought the same kind of meat? Explain why or why not.

Name _____ Date _____ Class _____

8. Lupita bought 7 pounds of pretzels at a local wholesaler for $16.80. Her friend Charles bought 5 pounds of pretzels at the supermarket for $12.75. Charles thinks he got the better deal because $12.75 is less than $16.80.

   a. Is Charles's reasoning correct? Explain why or why not.

   b. How much would Charles have spent if he had purchased the same amount of pretzels as Lupita?

9. Sam is renting one of two cars to go on a 300-mile trip. The first car can travel 75 miles on 5 gallons of gas. The second car can travel 240 miles on 20 gallons of gas. Each car costs the same to rent, and Sam wants to rent the car with the better gas mileage. Sam estimates that he will pay $49.42 for every 14 gallons of gas he has to buy. Which car should Sam rent, and how much money should Sam bring for gas? Explain your reasoning.

10. A band Martha likes just released a new album. A digital music service is selling the 12-song album for $9.96. The service also allows purchase of individual songs off the album, with 3 songs selling for $1.29 and 9 selling for $0.99. Martha likes all of the $1.29 songs and 6 of the $0.99 songs. She is considering buying just those songs or buying the whole album. What is the better deal in terms of price per song? Show your work.

Name _____ Date _____ Class _____

# 6.RP.3c

## SELECTED RESPONSE

**Select the correct answer.**

1. What is 5% of 200?

   (A) $\frac{1}{40}$

   (B) 10

   (C) 40

   (D) 1,000

2. What is 120% of 50?

   (A) 2.4

   (B) 6

   (C) 60

   (D) 6,000

3. A 15% tip on a diner bill is $2.55. How much is the bill?

   (A) $0.17

   (B) $0.38

   (C) $17.00

   (D) $38.25

4. 56.25% of what number is 168.75?

   (A) 3

   (B) 94.9219

   (C) 300

   (D) 9,492.19

**Select all correct answers.**

5. Choose all statements that are true.

   (A) 15% of 15 is 1.

   (B) 5% of 50 is 10.

   (C) 10% of 100 is 10.

   (D) 2% of 100 is 5.

   (E) 3% of 200 is 6.

**Match each library with its total number of books.**

____ 6. 30 books represent 2% of the total books at library 1.

____ 7. 45 books represent 5% of the total books at library 2.

____ 8. 60 books represent 1% of the total books at library 3.

____ 9. 75 books represent 10% of the total books at library 4.

____ 10. 90 books represent 3% of the total books at library 5.

**A** 750 books
**B** 900 books
**C** 1,500 books
**D** 2,000 books
**E** 3,000 books
**F** 6,000 books

## CONSTRUCTED RESPONSE

11. The state sales tax rate for North Carolina is 4.75%. The state sales tax rate for South Carolina is 6%. Shandra would like to buy a cookbook with a list price of $20.

    a. If Shandra buys this book in North Carolina, how much would she pay for sales tax?

    _____

    b. If she buys the same book on a trip to South Carolina, how much more sales tax would she pay compared to North Carolina?

    _____

Name _____ Date _____ Class _____

12. a. 1.5% of what number is 60? 15% of what number is 60? 150% of what number is 60?

b. What pattern do you notice in part a?

c. 2.5% of 2,000 is 50. Explain how to use the pattern you described in part b to find 25% of what number is 50.

13. Jane will receive 18% less of her regular pay when she retires. Her regular pay is $500 per week.

a. How much would she receive per week if she retires today?

b. Explain how you can calculate this using 100% – 18% = 82%.

c. Show why these calculations are equivalent in general. (*Hint*: Write an expression for finding an amount $A$ minus $n$% of $A$. Write another expression for finding $(100 - n)$% of $A$, and then use algebra to show that these two expressions are the same.)

Name _____ Date _____ Class _____

# 6.RP.3d

## SELECTED RESPONSE

**Select the correct answer.**

1. Heather's desk is 3 feet long. About how long is it in meters?
   Use 1 foot ≈ 0.305 meter.
   - (A) 0.00915 meter
   - (B) 0.9015 meter
   - (C) 0.915 meters
   - (D) 9.15 meters

2. A large container at a party holds 9 liters of lemonade. About how many gallons of lemonade does the container hold? Use 1 gallon ≈ 3.79 liters.
   - (A) 0.4 gallon
   - (B) 2.4 gallons
   - (C) 12.8 gallons
   - (D) 34.1 gallons

3. Joan mails a package that weighs 140 grams. About how many ounces is the package? Use 1 ounce ≈ 28.4 grams.
   - (A) 0.2 ounce
   - (B) 4.9 ounces
   - (C) 168.4 ounces
   - (D) 403.3 ounces

4. A printing company makes plastic banners 15 feet long by 6 feet wide. An overseas customer wants to know about how many square meters the banner is. Use 1 foot ≈ 0.305 meter.
   - (A) 8.37 square meters
   - (B) 27.5 square meters
   - (C) 90.0 square meters
   - (D) 900 square meters

**Select all correct answers.**

5. Choose all measurements that are equivalent to 45 meters.
   - (A) 450 centimeters
   - (B) 4,500 centimeters
   - (C) 0.045 kilometer
   - (D) 0.45 kilometer
   - (E) 4,500 millimeters

**Select the correct answer for each lettered part.**

6. John knows he can safely lift 30 pounds without help. He needs to move the following packages. Can he lift each safely without help? Use the following:
   1 pound ≈ 0.454 kilogram
   1 ounce ≈ 28.4 grams
   1 kilogram = 1,000 grams

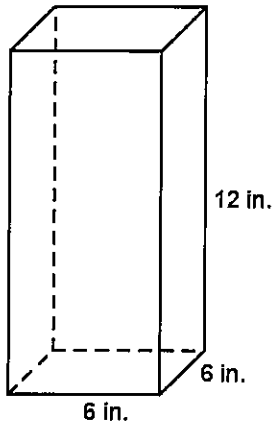
   | | | |
   |---|---|---|
   | a. 9.08 kilograms | ○ Yes | ○ No |
   | b. 9,080 grams | ○ Yes | ○ No |
   | c. 460 ounces | ○ Yes | ○ No |
   | d. 46 kilograms | ○ Yes | ○ No |

## CONSTRUCTED RESPONSE

7. A chemist has a beaker with 4 fluid ounces of a solution. The chemist needs 500 milliliters for an experiment. About how many more milliliters does the chemist need? Use 1 fluid ounce ≈ 29.6 milliliters and show your work.

Name _____ Date _____ Class _____

8. How many square centimeters of paper do you need to wrap the box shown below? Use 1 inch = 2.54 centimeters. Round your final answer to the nearest whole square centimeter. Show your work.




9. Jorge wants to buy new vinyl flooring for his kitchen. The kitchen floor is 12 feet by 15 feet. How many square yards is the floor? Show your work.

10. Tisha orders a carpet for a room that measures 270 square feet. The salesman says the carpet costs $12.00 per square yard. He explains that since there are 3 square feet for every square yard, Tisha needs 90 square yards of carpeting, which costs $1,080. What error did the salesman make? What should be the actual cost of the carpet?

11. A recipe includes the following juices. The measurements are given in milliliters.

    a. Find the amount of each in cups to complete the table. Use 1 fluid ounce ≈ 29.6 milliliters and 1 cup = 8 fluid ounces. Round to the nearest cup as necessary.

| Juice | Milliliters | Cups |
|---|---|---|
| Cranberry | 3,500 | |
| Orange | 950 | |
| Lemon | 240 | |

    b. One quart of cranberry juice equals 4 cups. How many quarts of cranberry juice are needed for the recipe? If you can only buy whole quarts of juice, will there be cranberry juice left over? Explain.

Name _____ Date _____ Class _____

# 6.EE.1

## SELECTED RESPONSE

**Select the correct answer.**

1. Which exponential expression equals $5 \times 5 \times 5 \times 5 \times 5 \times 5$?

   (A) $5^5$

   (B) $5^6$

   (C) $6^5$

   (D) $5^7$

2. Which is the expanded form of $7^5$?

   (A) $7 \times 7 \times 7 \times 7 \times 7 \times 7$

   (B) $5 \times 5 \times 5 \times 5 \times 5 \times 5 \times 5$

   (C) $7 \times 7 \times 7 \times 7$

   (D) $7 \times 7 \times 7 \times 7 \times 7$

3. Which is the expanded form of $3^2 \times 3^5$?

   (A) $3 \times 3 \times 3 \times 3 \times 3 \times 3 \times 3$

   (B) $9 \times 9 \times 9 \times 9 \times 9 \times 9 \times 9 \times 9 \times 9$

   (C) $3 \times 3 \times 3 \times 3 \times 3 \times 3 \times 3 \times 3 \times 3 \times 3$

   (D) $9 \times 9 \times 9 \times 9 \times 9 \times 9 \times 9$

4. Which is the value of $6^4$?

   (A) 216

   (B) 1,296

   (C) 4,096

   (D) 7,776

**Select all correct answers.**

5. Which of the following expressions is equal to 64?

   (A) $2^4$

   (B) $8^2$

   (C) $6^3$

   (D) $2^6$

   (E) $4^3$

**Match each exponential expression with its expanded form.**

____ 6. $2^3 \times 5^4$

____ 7. $9^3 \times 11^5$

____ 8. $12^5$

____ 9. $2^4 \times 5^4$

____ 10. $9^4 \times 11^5$

**A** $2 \times 2 \times 2 \times 2 \times 5 \times 5 \times 5 \times 5$

**B** $12 \times 12 \times 12 \times 12 \times 12 \times 12 \times 12$

**C** $9 \times 9 \times 9 \times 9 \times 11 \times 11 \times 11 \times 11 \times 11$

**D** $5 \times 5 \times 5 \times 5 \times 5 \times 3 \times 3 \times 3$

**E** $5 \times 5 \times 5 \times 2 \times 2$

**F** $9 \times 9 \times 9 \times 11 \times 11 \times 11 \times 11 \times 11$

**G** $2 \times 2 \times 2 \times 5 \times 5 \times 5 \times 5$

**H** $12 \times 12 \times 12 \times 12 \times 12$

## CONSTRUCTED RESPONSE

11. Louis evaluated the expression $3^5 + 6^3$, but he made a mistake. His work is shown. Identify Louis's mistake and show how to find the correct answer.

$$3^5 + 6^3 = 5 \times 5 \times 5 + 3 \times 3 \times 3 \times 3 \times 3 \times 3$$
$$= 854$$

Name _____ Date _____ Class _____

12. Evaluate $11^2 \times 2^3 + 3^5 + 9^3$. Show your work.

13. A square has a side length of 8 centimeters.

    a. The area of a square is the square of the side length. Write and evaluate an exponential expression for the area of the given square.

    b. If the given square is one side of a cube, the surface area of the cube will be 6 times the area of the square. Write and evaluate an exponential expression for the surface area of the cube.

    c. If the given square is one side of a cube, the volume of the cube will be the cube of the side length of the square. Write and evaluate an exponential expression for the volume of the cube.

14. Kerry puts pennies into a jar every day. On the first day, she puts 2 pennies into the jar. On the second day, she adds double the number of pennies she put into the jar on the first day. On the third day, she adds double the number of pennies she put into the jar on the second day. This pattern follows for a week.

    a. Write exponential expressions for the number of pennies put into the jar on the second, third, and fourth days.

    b. What pattern do you notice in the expressions you wrote for part a?

    c. Write an expression in exponential form for the number of pennies she puts into the jar on the seventh day. Expand and evaluate the expression.

    d. How much money will be in the jar at the end of the week?

Name _____ Date _____ Class _____

# 6.EE.2a

## SELECTED RESPONSE

**Select the correct answer.**

1. Which expression below represents "$k$ more than 8"?

   (A) $8k$

   (B) $8 + k$

   (C) $8 - k$

   (D) $\frac{8}{k}$

2. Which statement below could be represented by the expression $7 - t$?

   (A) $t$ less than 7

   (B) 7 times $t$

   (C) $t$ more than 7

   (D) 7 less than $t$

3. Which statement below CANNOT be represented by the expression $t - 16$?

   (A) 16 less than $t$

   (B) $t$ decreased by 16

   (C) $t$ less than 16

   (D) 16 subtracted from $t$

4. Marcus and Judy are picking apples. At the end of the day, Marcus has $a$ apples. Judy has 5 times as many apples as Marcus. How many apples does Judy have in terms of $a$?

   (A) $a - 5$

   (B) $5 + a$

   (C) $\frac{5}{a}$

   (D) $5a$

**Select all correct answers.**

5. Which of the following statements could be represented by the expression $d - 10$?

   (A) 10 less than $d$

   (B) 10 more than $d$

   (C) $d$ decreased by 10

   (D) $d$ less than 10

   (E) $d$ minus 10

   (F) $d$ increased by 10

6. Which of the following indicates that the operation is addition?

   (A) 8 plus $j$

   (B) $k$ fewer than 10

   (C) $r$ increased by 7

   (D) 14 divided by $n$

   (E) 11 decreased by $h$

   (F) 6 more than $s$

**Select the correct answer for each lettered part.**

7. Choose the operation that is indicated by each statement.

   a. 5 more than $n$ ○+ ○− ○× ○÷

   b. 11 fewer than $w$ ○+ ○− ○× ○÷

   c. $k$ divided by 4 ○+ ○− ○× ○÷

   d. $y$ less than 8 ○+ ○− ○× ○÷

   e. 2 times $r$ ○+ ○− ○× ○÷

   f. 9 increased by $g$ ○+ ○− ○× ○÷

Name _____ Date _____ Class _____

## CONSTRUCTED RESPONSE

8. Rebecca and Clark are playing baseball. During the first hour, Rebecca has $r$ hits and Clark has 3 more hits than Rebecca. During the second hour, Clark has $c$ hits and Rebecca hits 5 fewer than twice the number of Clark's hits.

   a. Write an expression for the number of hits Clark made in the first hour.

   b. Write an expression for the number of hits Rebecca made in the second hour.

9. The zoo has lions, tigers, and bears. There are $t$ tigers in the zoo.

   a. How many lions are in the zoo if there are 3 more lions that tigers?

   b. How many bears are in the zoo if the number of bears is two times the number of lions?

10. a. Write an expression represented by the statement "3 more than $n$."

    b. Write an expression represented by the statement "$n$ increased by 3."

    c. Write an expression represented by the statement "$n$ plus 3."

    d. What can you say about the statements in parts a through c in terms of the expressions they represent?

11. A construction crew is installing lights in a room. The room has an area of $s$ square feet. The number of lights required in the room is $s$ divided by 5.

    a. How many lights are required in the room?

    b. The construction crew has 10 more lights than the number of lights required. Use your answer from part a to write an expression for the number of lights the construction crew has.

    c. Some of the lights are broken, so it turns out that the construction crew has 15 fewer lights than the number of lights required. Use your answer from part a to write an expression for the number of lights the construction crew has.

    d. After receiving a new shipment, the construction crew has twice the number of required lights. Use your answer from part a to write an expression for the number of lights the construction crew has.

12. Trudy is ordering pies from Sal. Trudy orders 3 more apple pies than $c$ cherry pies. Sal gives Trudy $c$ cherry pies and $c - 3$ apple pies. Explain Sal's mistake and correct it.

Name _____ Date _____ Class _____

# 6.EE.2b

## SELECTED RESPONSE

**Select the correct answer.**

1. Which expression is the product of two factors?

   (A) $8(5 + n)$

   (B) $2 + h$

   (C) $\frac{x}{3}$

   (D) $t - 9$

2. In the expression $n + 23$, what is 23?

   (A) A coefficient

   (B) A factor

   (C) A term

   (D) A sum

3. Which expression is a quotient?

   (A) $9r$

   (B) $\frac{b}{12}$

   (C) $15 + d$

   (D) $m - 4$

4. Which is the coefficient in the expression $23y + 5$?

   (A) $y$

   (B) 5

   (C) $23y$

   (D) 23

**Select the correct answer for each lettered part.**

5. Identify each expression as a sum, a difference, a product, or a quotient.

| | | | | |
|---|---|---|---|---|
| a. $4t$ | ○ Sum | ○ Difference | ○ Product | ○ Quotient |
| b. $6 - u$ | ○ Sum | ○ Difference | ○ Product | ○ Quotient |
| c. $f + 10$ | ○ Sum | ○ Difference | ○ Product | ○ Quotient |
| d. $27(v + 3)$ | ○ Sum | ○ Difference | ○ Product | ○ Quotient |
| e. $42 + k$ | ○ Sum | ○ Difference | ○ Product | ○ Quotient |
| f. $\frac{t}{13}$ | ○ Sum | ○ Difference | ○ Product | ○ Quotient |

## CONSTRUCTED RESPONSE

6. Write the expression represented by the statement "7 times the sum of 2 and $x$." Identify the factors in the expression.

_____

_____

_____

7. Identify two sums in the expression $14 + b + 27d$. Identify the terms of each.

_____

_____

_____

Name _____ Date _____ Class _____

8. Identify each product in the expression $14n + 2 + 6k$ and then identify the coefficients in each product.

9. a. Identify the terms of the expression $7x^2 + 2y - 8$. Identify which terms in the expression are products and find the coefficients in those products.

   b. List the order of operations used to evaluate the expression. What is the value of the expression at $x = 2$ and $y = -1$?

10. Lara says the factors of the expression $(5 + s)(k + 7)$ are 5, $s$, $k$, and 7. Is this correct? If not, explain what Lara found and write the correct factors.

11. Use the expression $56xy + 5 - 6x + \frac{y}{20}$, for the following questions.

    a. Identify two sums.

    b. Identify the terms of the expression.

    c. Identify a product of two factors. Find the coefficient in the product.

    d. Identify the quotient.

12. Identify all sums, products, and factors in the expression.

    $(x + 5)(y + 9) + (2 + x)(y + 23)$

Name _____ Date _____ Class _____

# 6.EE.2c

## SELECTED RESPONSE

**Select the correct answer.**

1. Helen bought notebooks and pencils for school. The number of pencils she bought is given by $6(n - 3)$, where $n$ is the number of notebooks she bought. How many pencils did Helen buy if she bought 5 notebooks?

   (A) 2 pencils

   (B) 12 pencils

   (C) 27 pencils

   (D) 48 pencils

2. In what order should the operations be performed to evaluate $6x^2 - 2$ at $x = 3$?

   (A) First, multiply 6 by 3. Then, square the result. Finally, subtract 2 from the result.

   (B) First, find $3^2$. Then, subtract 2 from the result. Finally, multiply the result by 6.

   (C) First, find $3^2$. Then, multiply the result by 6. Finally, subtract 2 from the result.

   (D) First, multiply 6 by 3. Then, subtract 2 from the result. Finally, square the result.

3. What is the value of the expression $\frac{8}{n} - \frac{1}{2}n^2$ at $n = 4$?

   (A) –6

   (B) –2

   (C) 2

   (D) 24

4. The area of a triangle is given by the formula $A = \frac{1}{2}bh$. What is the area of the triangle if $b = 5$ and $h = 4$?

   (A) 2 (C) 4.5

   (B) 2.5 (D) 10

**Select all correct answers.**

5. Which expressions are equal to 41 when evaluated at $d = 4$?

   (A) $9d + 5$

   (B) $7 + 3d^2$

   (C) $10d - 1$

   (D) $11d - \frac{12}{d}$

   (E) $d^3 - 23$

## CONSTRUCTED RESPONSE

6. A rectangular box with dimensions $\ell$ by $w$ by $h$ has a surface area $A$ given by $A = 2\ell w + 2\ell h + 2wh$. Its volume $V$ is given by $V = \ell wh$. If the dimensions of the box are given as 5 feet by 3 feet by 2.5 feet, what is the surface area and volume of the box? Show your work.

7. Evaluate the expression $\frac{1}{4}y + 10 + y^2$ for $y = 8$.

Name _____ Date _____ Class _____

8. Mandy has $q$ quarters. The number of nickels she has is 4 times the number of quarters. She has 10 more dimes than quarters.

   a. Write expressions for the number of nickels and dimes Mandy has.

   b. How many nickels and dimes does she have if she has $5 in quarters?

9. Evaluate the expression $11k + 9 - k^2 - \frac{15}{k}$ at $k = 5$. Show your work.

10. Mark incorrectly evaluated the expression $4x + 12 - x^2$ at $x = 2$. His work is shown. Identify and correct Mark's mistake. Show your work.

$$\begin{aligned} 4(2)+12-2^2 &= 4(2)+10^2 \\ &= 4(2)+100 \\ &= 8+100 \\ &= 108 \end{aligned}$$

11. Rosa is putting cube-shaped tissue boxes into a shipping crate. Each tissue box has a side length of 4 inches.

   a. The volume $V$ of a cube is given by $V = s^3$, where $s$ is the side length of the cube. What is the volume of one tissue box?

   b. If 32 tissue boxes fit into the crate without any gaps or space left over, what is the volume of the crate? Explain how you find your answer.

   c. Can you tell what the dimensions of the crate are if you only know its volume? Explain why and give the dimensions, or explain why not.

12. Tyler is planting a garden. The garden will contain mums that cost $7 each and daisies that cost $10 for 3.

   a. Write an expression for the cost of $m$ mums and $d$ daisies.

   b. How much will it cost for 7 mums and 6 daisies? Show your work.

   c. How much will it cost for 3 mums and 9 daisies? Show your work.

Name _____ Date _____ Class _____

# 6.EE.3

## SELECTED RESPONSE

**Select the correct answer.**

1. Which expression is equivalent to $12x - 3x$?

   (A) $x(12 - 3)$

   (B) $8x$

   (C) $3(3x - x)$

   (D) $9$

2. What property is used to say that the expression $5x + 7 - 2x$ is equivalent to the expression $5x - 2x + 7$?

   (A) Commutative property of addition

   (B) Commutative property of multiplication

   (C) Associative property of addition

   (D) Distributive property

3. What expression is equivalent to the expression $(1 + 4x) + 2x$?

   (A) $7x$

   (B) $5x + 2x$

   (C) $1 + 6x$

   (D) $x(4 + 2)$

4. The expression $11x^3 - 6y + 2x^3$ is simplified as follows. Which property is NOT used to simplify the expression?

$$\begin{aligned} 11x^3 - 6y + 2x^3 &= 11x^3 + 2x^3 - 6y \\ &= x^3(11 + 2) - 6y \\ &= x^3(13) - 6y \\ &= 13x^3 - 6y \end{aligned}$$

   (A) Commutative property of addition

   (B) Commutative property of multiplication

   (C) Associative property of multiplication

   (D) Distributive property

**Select all correct answers.**

5. The expression $(y + 14x) - 5x - x^2$ is simplified as follows. Which properties of operations are used to simplify the expression?

$$\begin{aligned} (y + 14x) - 5x - x^2 &= y + (14x - 5x) - x^2 \\ &= y + x(14 - 5) - x^2 \\ &= y + x(9) - x^2 \\ &= y + 9x - x^2 \end{aligned}$$

   (A) Commutative property of addition

   (B) Commutative property of multiplication

   (C) Associative property of addition

   (D) Associative property of multiplication

   (E) Distributive property

## CONSTRUCTED RESPONSE

6. a. Use the distributive property to write $23y - (7x - 2y) + x$ without parentheses.

   _____

   _____

   _____

   b. Use the commutative property of addition to collect like terms.

   _____

   _____

   _____

   c. Simplify the result from part b.

   _____

   _____

7. Simplify the expression $(2x + 3y) + y$ using the properties of operations. Show your work.

   _____

   _____

Name _____ Date _____ Class _____

8. Amy is buying fruit for a party she is having. She buys the fruit over a 3-day period. The first day, she buys $a$ apples and $n$ nectarines. The second day, she buys twice as many apples as she bought the first day. On the third day, she buys 10 bananas.

   a. Write an expression for the total number of pieces of fruit Amy buys. Do not simplify.

   b. Explain how to use the order of operations to simplify the expression. Show your work.

9. A rectangular prism has length $a$, width $b$, and height $c$.

   a. Using the formula $A = \ell w$, find the area of each face of the prism and write an expression for the sum of the areas. Collect like terms, and then use the distributive property to simplify the expression so that there are three terms inside the parentheses. Show your work.

   b. Use the result from part a to write an expression for the total surface area of a cube with side length $a$. Use the properties of operations to simplify the expression to one term. Show your work.

10. Laura mistakenly found that the expression $4x - 6y$ is equivalent to the expression $12x - 18y - 4(2x + 3y)$. Her work is shown. Find and correct Laura's mistake. Use the properties of operations to correctly simplify $12x - 18y - 4(2x + 3y)$ to two terms. Show your work.

$$12x - 18y - 4(2x + 3y) = 12x - 18y - 8x + 12y \quad \text{Distributive property}$$
$$= 12x - 8x - 18y + 12y \quad \text{Commutative property of addition}$$
$$= 4x - 6y \quad \text{Combine like terms.}$$

Name _____ Date _____ Class _____

# 6.EE.4

## SELECTED RESPONSE

**Select the correct answer.**

1. Which expression is NOT equivalent to the expression $11 - (3x + 2)$?

   (A) $11 - 3x - 2$

   (B) $9 - 3x$

   (C) $11 - 3x + 2$

   (D) $11 + (-3x - 2)$

2. Which expression is equivalent to $12x - 3(x + 2)$?

   (A) $12x + 6$

   (B) $12x - 6$

   (C) $9x + 6$

   (D) $9x - 6$

3. Which pair of expressions are equivalent?

   (A) $4x - 2 + 5x$ and $7x$

   (B) $(11 + 3x) - x$ and $11 + 2x$

   (C) $12(x - 2)$ and $12x - 2$

   (D) $9x(4)$ and $13x$

**Select all correct answers.**

4. Which expressions are equivalent to the expression $2x - (-3x + 8y) + 8$?

   (A) $2x + (3x + 8y) + 8$

   (B) $2x + (3x - 8y) + 8$

   (C) $(2x + 3x) - 8y + 8$

   (D) $3x + 8$

   (E) $5x - 8y + 8$

**Match each expression with an equivalent expression.**

_____ 5. $3x - 2 + 8x$

_____ 6. $4x - (2x + 1)$

_____ 7. $11(x - 1) + 2$

_____ 8. $4(3x)$

_____ 9. $-13x + 5x$

**A** $12x$

**B** $2x - 1$

**C** $7x$

**D** $11x - 9$

**E** $11x - 2$

**F** $2x + 1$

**G** $-8x$

## CONSTRUCTED RESPONSE

10. Blaine and Tanya are selling pumpkins and tomatoes at a farm stand. Blaine sells $p$ pumpkins and $t$ tomatoes on the first day. The second day he sells double what he sells the first day. Over both days, Tanya sells triple what Blaine sells on the first day.

    a. Write an expression for the total number of pumpkins and tomatoes Blaine sold both days.

    _____

    b. Write an expression for the total number of pumpkins and tomatoes Tanya sold both days.

    _____

    c. Did Blaine and Tanya sell the same amount? Explain.

    _____

Name _____ Date _____ Class _____

11. Peter is making cookies. He needs to add a total of $2\frac{1}{4}$ cups of flour and $2\frac{2}{3}$ cups of sugar per batch. At the beginning of the recipe, he only adds $1\frac{3}{4}$ cups of flour and $\frac{2}{3}$ cup of sugar per batch. He adds $\frac{1}{2}$ cup of flour and $1\frac{1}{3}$ cups of sugar per batch later in the recipe.

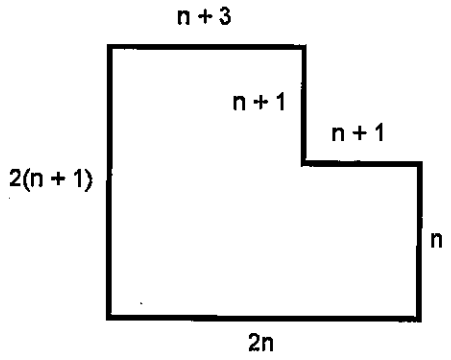
    a. Write an expression for the number of cups of flour Peter added to make $b$ batches of cookies.

    b. Write an expression for the number of cups of sugar Peter added to make $b$ batches of cookies.

    c. Simplify the expressions from parts a and b. Did Peter add enough flour and sugar to his cookies?

12. Show that the expression $(8x - 12y) + y + 2(3 + 3x)$ is equivalent to the expression $-11y + 6 + 14x$. Use the properties of operations to justify your steps.

13. Nick is finding the perimeter of a garden. The measurements of the garden are given below. Nick's expression for the perimeter is $2n + 1 + 2n + 4n + 5$.




    a. Write an expression for the perimeter of the garden.

    b. Simplify the expression from part a to two terms. Show your work.

    c. Is Nick's expression for the perimeter correct? Show your work.

Name _____ Date _____ Class _____

# 6.EE.5

## SELECTED RESPONSE

**Select the correct answer.**

1. For what value of $x$ is the equation $4 = 12x - 2$ true?

   (A) $\frac{1}{6}$

   (B) $\frac{1}{2}$

   (C) 2

   (D) 6

2. Which values from the set {1, 2, 3, 4, 5, 6} are solutions of $9 < 2x + 3$?

   (A) $x = \{1, 2\}$

   (B) $x = \{3, 4, 5, 6\}$

   (C) $x = \{4, 5, 6\}$

   (D) $x = \{1, 2, 3, 4, 5, 6\}$

3. What is a common solution of $x - 8 \leq 2$ and $7 \leq 2x - 13$?

   (A) 9

   (B) 10

   (C) 11

   (D) The inequalities do not have a common solution.

4. Rachel is typing a 1,500-word report. Her progress is represented by the equation $1{,}500 = 500 + 50t$, where $t$ is the number of minutes spent typing. If she does not take a break, how many minutes does Rachel need to type to finish her report?

   (A) 10 minutes

   (B) 20 minutes

   (C) 30 minutes

   (D) 40 minutes

**Select all correct answers.**

5. Which statements below are true when $x = 5$?

   (A) $3 = 2x - 7$

   (B) $3 < 2x - 9$

   (C) $2 \leq x + 6$

   (D) $18 = 6x - 12$

   (E) $3 = 2 + x$

## CONSTRUCTED RESPONSE

6. Is 4 a solution of $7 \leq 5x - 16$? Show your work.

7. Do all of the values from the set {5, 6, 7} make the inequality $9x - 3 < 60$ true? Explain.

8. What value(s) from the set {0, 1, 2} make the equation $4x + 9 = 13$ true? Show your work.

Name _____ Date _____ Class _____

9. What values from the set of natural numbers make the inequality $6 + 2x > 8$ true? Explain.

10. Kyle is saving his money to buy a computer for $300. He has already saved $75, and plans to save an additional $22.50 each day.

    a. Write an equation for the number of days Kyle will need to save in order to buy the computer.

    b. If Kyle saves for 10 days, will he have enough money to buy the computer? Explain.

11. a. Which values from the set {1, 2, 3, 4} are solutions of $11 \geq 2x + 5$? Show your work.

    b. Which values from the set {1, 2, 3, 4} are solutions of $11 > 2x + 5$? Show your work.

    c. How are your answers from parts a and b different?

12. Jasmine says that 2 and 3 are solutions of the inequality $16 \geq 11x - 6$. Is Jasmine correct? Explain. Show your work.

Name _____ Date _____ Class _____

# 6.EE.6

## SELECTED RESPONSE

**Select the correct answer.**

1. There are red and blue marbles in a bowl. There are twice as many blue marbles as red marbles. What expression represents the number of blue marbles?

   (A) $2b$, where $b$ is the number of blue marbles

   (B) $2r$, where $r$ is the number of red marbles

   (C) $r + 2$, where $r$ is the number of red marbles

   (D) $\frac{b}{2}$, where $b$ is the number of blue marbles

2. $x$ is 4 less than a number $y$. What expression represents the value of $x$?

   (A) $x - 4$

   (B) $y - 4$

   (C) $x + 4$

   (D) $y + 4$

3. Kyle starts with \$15.00 and saves \$3.50 each day. What expression represents the total amount Kyle saves?

   (A) \$3.50

   (B) \$15.00

   (C) $3.5t + 15$, where $t$ is the number of days

   (D) $15t + 3.5$, where $t$ is the number of days

4. The product of two different numbers is 132. If one of the numbers is $x$, what expression represents the value of the other number?

   (A) $\frac{132}{x}$

   (B) $132x$

   (C) $132 - x$

   (D) $x + 132$

**Select all correct answers.**

5. Joan has 3 fewer dogs than rabbits. If $r$ is the number of rabbits Joan has, which expressions represent the total number of animals Joan has?

   (A) $r$

   (B) $r + (r - 3)$

   (C) $r - 3$

   (D) $2r - 3$

   (E) $r + (r + 3)$

## CONSTRUCTED RESPONSE

6. Paulo and Marie are collecting quarters. The number of quarters Paulo has is 3 times the quantity of 5 fewer than the number of quarters Marie has. Write an expression for the number of quarters Paulo in terms of the number of quarters Marie has. Define any variables used.

   _____

   _____

   _____

   _____

7. The value of $x$ is 3 more than half the value of $y$.

   a. Write an expression for the value of $x$ in terms of $y$.

   _____

   b. What is the value of $x$ if $y = 7$? Show your work.

   _____

   _____

   _____

   _____

   _____

Name _____ Date _____ Class _____

8. Daisies and tulips are planted in a garden. There are 11 fewer tulips planted than daisies.

   a. Write an expression that represents the number of tulips in terms of the number of daisies. Define any variables used.

   b. If 18 daisies are planted, how many tulips are planted?

9. Elena is selling tickets for an amusement park. She sells triple the number of student tickets as adult tickets and she sells 8 fewer senior tickets than adult tickets.

   a. Write expressions for the number of adult tickets, student tickets, and senior tickets, using *a* as the number of adult tickets.

   b. Using your answers from part b, write a simplified expression for the total number of tickets Elena sells.

   c. If Elena sells 15 adult tickets, does she sell at least 100 total tickets? Show your work.

10. A group of students collect a number of shells on the beach. They sort the shells into three piles based on the size of each shell. The first pile has half as many shells as the number they collected. The second pile has 10 fewer shells than the first pile. The third pile has the remaining shells.

    a. Write simplified expressions for the number of shells in each pile in terms of the total number of shells. Define any variables used.

    b. If there are 22 shells in the first pile, how many total shells did the students collect? Explain two ways you could find the total number of shells.

Name _____ Date _____ Class _____

# 6.EE.7

## SELECTED RESPONSE

**Select the correct answer.**

1. Which of these equations has the same solution as the equation $x + 5 = 12$?

   (A) $x + 5 = 7$

   (B) $x + 8 = 15$

   (C) $x + 7 = 12$

   (D) $x + 12 = 20$

2. Thomas put $\frac{1}{4}$ of the $c$ coins he had in his pocket into the jar under his bed. He put 16 coins into the jar. The equation that models this situation is $\frac{1}{4}c = 16$. How many coins did Thomas have in his pocket?

   (A) 4 coins

   (B) 12 coins

   (C) 20 coins

   (D) 64 coins

3. What is the procedure for solving the equation $\frac{1}{2}x = 16$?

   (A) Add $\frac{1}{2}$ to both sides of the equation.

   (B) Subtract $\frac{1}{2}$ from both sides of the equation.

   (C) Multiply both sides of the equation by 2.

   (D) Multiply both sides of the equation by $\frac{1}{2}$.

4. There are 6 blue shirts and $g$ green shirts in a drawer. There are 11 shirts total in the drawer. What equation models this situation?

   (A) $6 + g = 11$

   (B) $6g = 11$

   (C) $6 - g = 11$

   (D) $\frac{1}{6}g = 11$

## CONSTRUCTED RESPONSE

5. What is the solution of the equation $3 + x = 9$? Show your work.

6. Sally measured the height of a flower growing in her garden. The flower was $3\frac{1}{4}$ inches tall. Over the next week, the flower grew $h$ inches and measured $4\frac{1}{8}$ inches tall. Write an equation that models the situation. Then solve the equation and state how much the flower grew during the week.

7. The sum of 6 and another number is 23. Write and solve an equation to find the other number. Show your work.

Name _____ Date _____ Class _____

8. Cho is driving a car. He gets to his destination, which is 72 miles away, in 1 hour and 30 minutes.

   a. The equation $d = rt$ can be used to model Cho's drive, where $d$ is the distance traveled, $r$ is the speed of the car, and $t$ is the amount of time spent traveling. Substitute Cho's time and distance into the equation.

   b. Solve the equation in part a to find Cho's speed. Show your work.

9. Kirk owns a bakery and is making muffins. Each batch of muffins uses $\frac{2}{3}$ cup of milk. He has 1 gallon of milk to use.

   a. If Kirk uses $\frac{1}{4}$ gallon of milk in total, how many batches of muffins did he make? Write and solve an equation to find the answer. Show your work. (Hint: There are 16 cups in 1 gallon.)

   b. Kirk earned $108 from selling the muffins. How much money did he earn per batch? Write and solve an equation to find how much money Kirk earned per batch.

10. Lauren incorrectly solves the equation $\frac{4}{5} + x = \frac{13}{5}$. Her work is shown below. Explain Lauren's mistake and find the correct solution. Show your work.

$$\frac{4}{5} + x = \frac{13}{5}$$
$$\frac{4}{5} + \frac{4}{5} + x = \frac{13}{5} + \frac{4}{5}$$
$$x = \frac{17}{5}$$

11. Adam is saving money to buy a computer. He saves $s$ dollars each week. After 7 weeks, he has $315 saved.

    a. Write an equation that models the situation.

    b. How much does Adam save each week? Show your work.

    c. The computer Adam wants to buy is $450. How many more weeks does he have to save to buy the computer? Write an equation to model this situation and solve. Show your work.

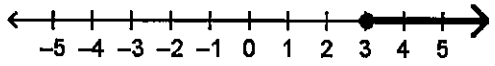
Name _____ Date _____ Class _____

# 6.EE.8

## SELECTED RESPONSE

**Select the correct answer.**

1. What inequality has the solutions graphed on the number line?




Ⓐ $x < 3$
Ⓑ $x \leq 3$
Ⓒ $x > 3$
Ⓓ $x \geq 3$

2. All of the students in a class are older than 10 years. What inequality represents the ages $a$ of the students?

Ⓐ $a < 10$
Ⓑ $a \leq 10$
Ⓒ $a > 10$
Ⓓ $a \geq 10$

3. Dianne is 5 feet and 6 inches tall. Manuel is taller than Dianne. What inequality represents Manuel's height $h$ in feet? Recall that there are 12 inches in a foot.

Ⓐ $h < 5.6$
Ⓑ $h > 5.6$
Ⓒ $h < 5.5$
Ⓓ $h > 5.5$

4. Jay jogs daily for exercise. He jogs faster than 3.5 miles per hour every day. Which inequality represents Jay's jogging speeds $s$?

Ⓐ $s < 3.5$
Ⓑ $s \leq 3.5$
Ⓒ $s > 3.5$
Ⓓ $s \geq 3.5$

**Select all correct answers.**

5. Which inequalities share some solutions with $x \geq 3$?

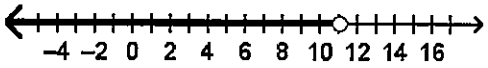
Ⓐ $x > 3$
Ⓑ $x < 0$
Ⓒ $x \leq 3$
Ⓓ $x \geq 5$
Ⓔ $x < 3$

## CONSTRUCTED RESPONSE

6. Jenna eats dinner at a restaurant. Her bill is $14.50. Jenna pays her bill and leaves a tip. Write an inequality to represent the total cost of Jenna's dinner.

_____

7. Describe the values graphed on the number line in words. The number line represents the solutions of what inequality? How many solutions does this inequality have?

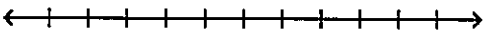


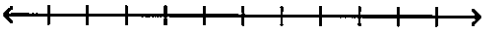

_____

_____

_____

8. Graph the solutions of $x < 2$ and $x \leq 2$ on the number lines. How are the solutions of the inequalities similar? How are they different?





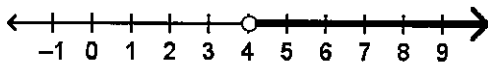
_____

_____

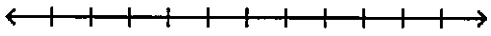
_____

Name _____ Date _____ Class _____

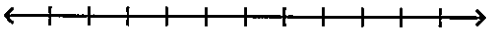
9. Keith wrote the inequality $x < 4$ to represent the statement "a number $x$ is less than 4." He graphed the solutions of the inequality on the number line shown. Did Keith write the inequality and graph the solutions correctly? Explain.




10. a. The value of $n$ is less than 20. Write the inequality that represents the value of $n$ and graph the solutions on the number line.



b. The value of $m$ is greater than 5. Write the inequality that represents the value of $m$ and graph the solutions on the number line.

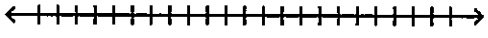


c. Describe the solutions graphed in parts a and b. Find any common solutions to both inequalities.

11. Savannah's daily commute from home to work is more than 35 miles each way.

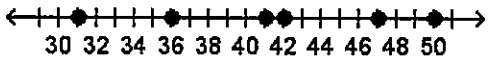
a. Write an inequality that represents this situation.

b. Graph the solutions of the inequality from part a.



c. If Savannah travels 35 miles from home, is it possible she is at work? Explain.

12. The graph on the number line shows the different amounts of money in dollars that Liam saves weekly.




a. Liam wants to save as much as or more than he did the week during which he saved the least. Write an inequality that represents this situation.

b. Describe the solutions of the inequality from part a in terms of the situation.

c. Does every solution of the inequality represent a realistic amount? Explain.

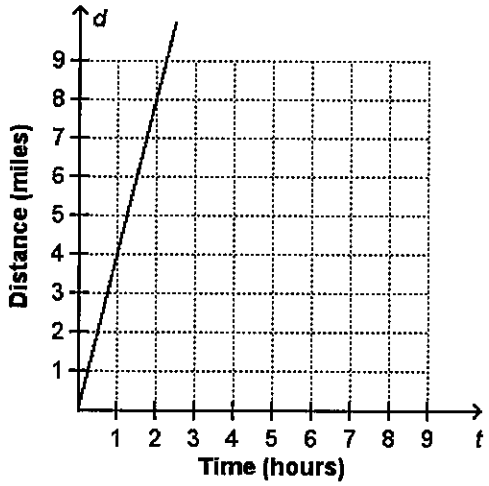
Name _____ Date _____ Class _____

# 6.EE.9

## SELECTED RESPONSE

**Select the correct answer.**

1. The graph below shows the relationship between the number of miles a person walks and the number of hours spent walking. What equation best describes the relationship between the two variables?




Ⓐ $t = 4d$

Ⓑ $d = 4t$

Ⓒ $t = d$

Ⓓ $d = \frac{1}{4}t$

2. A gardener is growing tomato plants. One plant starts out 5 cm tall. It grows a constant 2 cm every week. What equation represents the height $h$ of the plant after $t$ weeks?

Ⓐ $t = 5h + 2$

Ⓑ $t = 2h + 5$

Ⓒ $h = 5t + 2$

Ⓓ $h = 2t + 5$

3. The table below shows the balance of a savings account after $t$ weeks, where money is being withdrawn at a constant rate. Peter can find the balance of the account based on how many weeks have passed. What are the independent and dependent variables, and how do they change?

| Time (weeks), $t$ | Balance (dollars), $b$ |
|---|---|
| 0 | 850 |
| 1 | 800 |
| 2 | 750 |
| 3 | 700 |

Ⓐ As the independent variable $t$ increases by 1, the dependent variable $b$ increases by 50.

Ⓑ As the independent variable $t$ increases by 1, the dependent variable $b$ decreases by 50.

Ⓒ As the independent variable $b$ increases by 1, the dependent variable $t$ increases by 50.

Ⓓ As the independent variable $b$ increases by 1, the dependent variable $t$ decreases by 50.

**Select all correct answers.**

4. Gloria is an artist. She sets a goal to paint 2 pieces every month. She has already painted 5 pieces. The number of pieces Gloria paints depends on the number of months she spends painting. Which statements describe the number of pieces $p$ Gloria paints over $t$ months if she meets her goal?

Ⓐ $p$ is the independent variable and $t$ is the dependent variable.

Ⓑ $t$ is the independent variable and $p$ is the dependent variable.

Ⓒ $p$ increases by 2 as $t$ increases by 1.

Ⓓ $t$ increases by 2 as $p$ increases by 1.

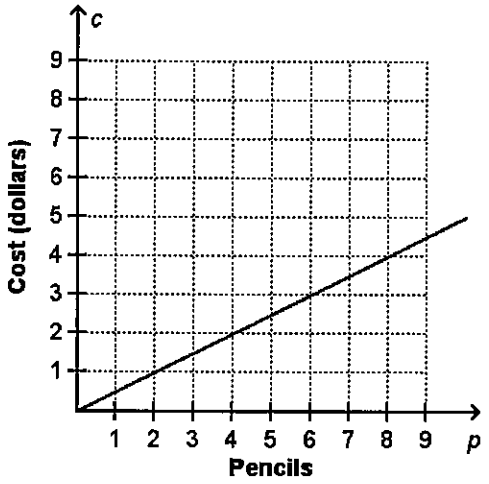
Ⓔ The equation representing the situation is $p = 2t + 5$.

Name _____ Date _____ Class _____

## CONSTRUCTED RESPONSE

5. An online bookstore is having a sale. All paperback books are $6.00, with a flat shipping fee of $2.50. Write an equation that represents the total cost $c$ based on buying $b$ books. Identify the independent and dependent variables and how the dependent variable changes in relation to the independent variable.

6. The graph below shows the relationship between the number of pencils bought and the cost. Describe the relationship between the two variables. Use this relationship to write an equation relating the two variables.

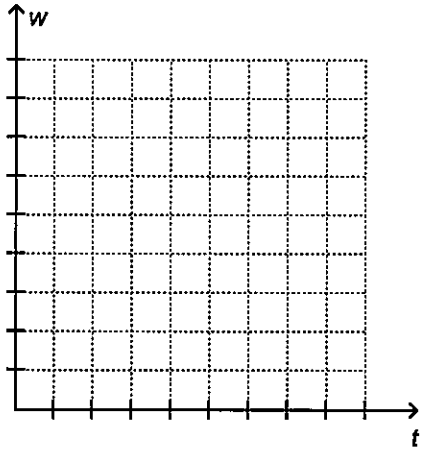



7. The table below shows the number of words $w$ a person types after $t$ minutes. The number of words typed per minute is a constant 52.

| Time (minutes), $t$ | Number of words, $w$ |
|---|---|
| 0 | 0 |
| 1 | 52 |
| 2 | 104 |
| 3 | 156 |

a. The number of words typed is determined by how many minutes the person spends typing. What are the independent and dependent variables?

b. Graph the values from the table.




c. Write an equation that represents the situation.

Name _____

# Compare and Order Decimals

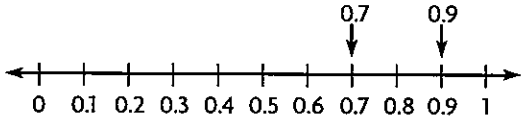
Skill 17

A **decimal** is a number with one or more digits to the right of the decimal point. There are different ways to compare decimals.

### Use a Number Line

Compare: 0.7 ○ 0.9.

The number line is labeled in intervals of tenths from 0 to 1. Find 0.7 and 0.9 on the number line.




On the number line, 0.7 is to the left of 0.9.

**So,** $0.7 < 0.9$

**Read:** ***is less than.***

### Use Place Value

Compare: 2.76 ○ 2.7.

Use a place value table.

- Align the digits by place values.
- Then compare digits starting with the ones place.
- Write a zero to the right of 7 in 2.7 so both numbers have the same number of places.

| ones | . | tenths | hundredths |
|---|---|---|---|
| 2 | . | 7 | 6 |
| 2 | . | 7 | 0 |

6 > 0

↑ Ones are the same. ↑ Tenths are the same. ↑ Hundredths are different.

- Since the ones and tenths are the same, compare hundredths. 6 hundredths are greater than 0 hundredths.

**So,** $2.76 > 2.70$.

**Read:** ***is greater than.***

### Order Decimals

Order from least to greatest: 1.38, 0.94, 0.5, 0.98.

- Write the numbers in a list. Align the digits. Write zeros if needed.

1.38
0.94
0.50
0.98

This number is greatest. None of the other numbers has ones.

? ? ? 1.38

least greatest

- Compare two numbers at a time.

| | | |
|---|---|---|
| 0.94 | 0.50 | 0.98 |
| 0.50 | 0.98 | 0.94 |
| same 9 > 5 | same 5 < 9 | same 8 > 4 |

$0.94 > 0.5$ $0.5 < 0.98$ $0.98 > 0.94$

In order from least to greatest, the numbers are:

0.5, 0.94, 0.98, 1.38

least greatest

Go to the next side.

Name _____ Skill _____

# Practice on Your Own

# Skill 17

Order the numbers from greatest to least: 1.37, 1.56, 1.23, 1.59.
List the numbers. Compare two numbers at a time.

1.37 ↖
1.56
1.23 ←
1.59
↑

Compare these first. Their tenths digits are different.

The ones digits are the same.

1.37 ○ 1.23
3 > 2
1.37 > 1.23

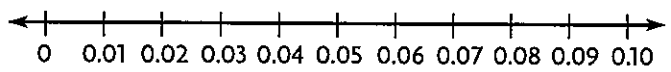
1.37 ○ 1.56
3 < 5
1.37 < 1.56

1.56 ○ 1.59
6 < 9
1.56 < 1.59

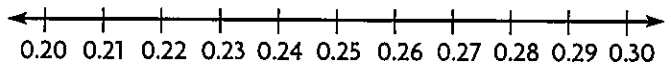
Ordered from greatest to least: 1.59, 1.56, 1.37, 1.23

**Use the number line. Write >, <, or = for ○.**

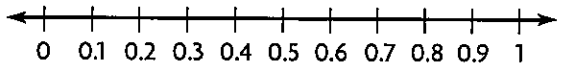
1. 0.09 ○ 0.02




2. 0.25 ○ 0.30




3. 0.5 ○ 0.1




**Use place value. Write >, <, or = for ○.**

4. 2.06 ○ 2.10

| ones | . | tenths | hundredths |
|---|---|---|---|
| | | | |
| | | | |

5. 4.8 ○ 4.19

| ones | . | tenths | hundredths |
|---|---|---|---|
| | | | |
| | | | |

6. 7.36 ○ 7.36

| ones | . | tenths | hundredths |
|---|---|---|---|
| | | | |
| | | | |

**Order the numbers from least to greatest, or greatest to least.**

7. 3.42, 0.89, 0.91
_____, _____, _____
least greatest

8. 2.65, 0.03, 2.4, 0.5
_____, _____, _____, _____
least greatest

9. 1.18, 1.27, 1.11, 1.3
_____, _____, _____, _____
greatest least

## Check

In Exercises 10 and 11, write >, <, or = for ○.

10. 0.72 ○ 0.7

11. 5.28 ○ 5.29

12. Order from greatest to least.
2.83, 1.7, 2.48, 2.38
_____

13. Order from least to greatest.
1.38, 0.5, 1.83, 1.18
_____

Name _____ Skill

# Write an Improper Fraction as a Mixed Number

## Skill 21

You can write an improper fraction as a mixed number. Write the fraction $\frac{9}{4}$ as a mixed number.

These are some different names for 1:
$\frac{2}{2}$ $\frac{3}{3}$ $\frac{4}{4}$ $\frac{5}{5}$ $\frac{6}{6}$ $\frac{7}{7}$ $\frac{8}{8}$

**Step 1**
Model $\frac{9}{4}$ with circles for $\frac{1}{4}$.

$\frac{9}{4} = \frac{4}{4} + \frac{4}{4} + \frac{1}{4}$

**Step 2**
Group the $\frac{1}{4}$ parts as wholes and parts.

$\frac{9}{4} = \frac{4}{4} + \frac{4}{4} + \frac{1}{4}$

$= 1 + 1 + \frac{1}{4}$

**Step 3**
Write the sum as a mixed number.

$\frac{9}{4} = 1 + 1 + \frac{1}{4}$

$= 2 + \frac{1}{4}$

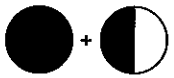
$= 2\frac{1}{4}$

So, $\frac{9}{4}$ written as a mixed number is $2\frac{1}{4}$.

### Try These

Write each improper fraction as a mixed number.

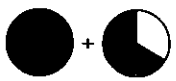
**1** $\frac{3}{2} = \frac{2}{2} + \frac{1}{2}$



$= \_\_\_\_ + \frac{1}{2}$

$= \_\_\_\_$

**2** $\frac{5}{3} = \frac{3}{3} + \frac{2}{3}$



$= \_\_\_\_ + \frac{2}{3}$

$= \_\_\_\_$

**3** $\frac{11}{4} = \frac{4}{4} + \frac{4}{4} + \frac{3}{4}$

$= \_\_\_\_ + \_\_\_\_ + \frac{3}{4}$

$= \_\_\_\_$

Go to the next side.

Name _____ Skill _____

# Practice on Your Own

# Skill 21

**Think:**
Find the names for 1 in fraction form.
Then add the names for 1 and the fraction.
Write the sum as a mixed number.

$$\frac{12}{5} = \frac{5}{5} + \frac{5}{5} + \frac{2}{5}$$
$$= 1 + 1 + \frac{2}{5}$$
$$= 2 + \frac{2}{5}$$
$$= 2\frac{2}{5}$$

Write each improper fraction as a mixed number.

**1** $\frac{9}{2} = \frac{\square}{2} + \frac{\square}{2} + \frac{\square}{2} + \frac{\square}{2} + \frac{\square}{2}$

= ___ + ___ + ___ + ___ + ___

= ___ + ___

= _____

**2** $\frac{8}{3} = \frac{\square}{3} + \frac{\square}{3} + \frac{\square}{3}$

= ___ + ___ + ___

= ___ + ___

= _____

**3** $\frac{15}{4} = \frac{\square}{4} + \frac{\square}{4} + \frac{\square}{4} + \frac{\square}{4}$

= ___ + ___ + ___ + ___

= ___ + ___

= _____

**4** $\frac{13}{5} = \frac{\square}{\square} + \frac{\square}{\square} + \frac{\square}{\square}$

= ___ + ___ + ___

= ___ + ___

= _____

**5** $\frac{7}{2} = \frac{\square}{\square} + \frac{\square}{\square} + \frac{\square}{\square} + \frac{\square}{\square}$

= ___ + ___ + ___ + ___

= ___ + ___

= _____

**6** $\frac{11}{3} = \frac{\square}{\square} + \frac{\square}{\square} + \frac{\square}{\square} + \frac{\square}{\square}$

= ___ + ___ + ___ + ___

= ___ + ___

= _____

**7** $\frac{15}{8}$ = _____

**8** $\frac{24}{5}$ = _____

**9** $\frac{19}{6}$ = _____

## Check

Write each improper fraction as a mixed number.

**10** $\frac{25}{8}$ = _____

**11** $\frac{27}{10}$ = _____

**12** $\frac{17}{4}$ = _____

Name _____

# Write a Mixed Number as a Fraction

Skill 22

**Write the mixed number $3\frac{1}{2}$ as an improper fraction.**

**Step 1**
Write the whole number as a sum of ones.

$3\frac{1}{2} = 1 + 1 + 1 + \frac{1}{2}$

**Step 2**
Use the denominator of the fraction to write equivalent fractions for the ones.

$3\frac{1}{2} = \underset{\downarrow}{1} + \underset{\downarrow}{1} + \underset{\downarrow}{1} + \frac{1}{2}$

$= \frac{2}{2} + \frac{2}{2} + \frac{2}{2} + \frac{1}{2}$

**Step 3**
Add the numerators to find the improper fraction.

$3\frac{1}{2} = \underset{\downarrow}{1} + \underset{\downarrow}{1} + \underset{\downarrow}{1} + \frac{1}{2}$

$= \frac{2}{2} + \frac{2}{2} + \frac{2}{2} + \frac{1}{2}$

$= \frac{7}{2}$

**So,** the fraction for $3\frac{1}{2}$ is $\frac{7}{2}$.

## Try These

Write each mixed number as an improper fraction.

**1** $2\frac{1}{3}$

$2\frac{1}{3} = 1 + 1 + \frac{1}{3}$

$= \frac{\square}{3} + \frac{\square}{3} + \frac{1}{3}$

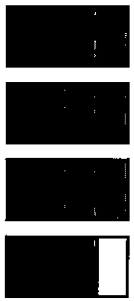
$= \frac{\square}{3}$

**2** $3\frac{3}{4}$

$3\frac{3}{4} = 1 + 1 + 1 + \frac{3}{4}$

$= \frac{\square}{4} + \frac{\square}{4} + \frac{\square}{4} + \frac{3}{4}$

$= \frac{\square}{\square}$



**3** $1\frac{4}{5}$

$1\frac{4}{5} = 1 + \frac{4}{5}$

$= \frac{\square}{5} + \frac{4}{5}$

$= \frac{\square}{\square}$

Go to the next side.

Name _____ Skill _____

# Practice on Your Own

## Skill 22

**Think:**
Write the whole number as a sum of ones.
Write equivalent fractions for the ones.
Add the numerators to find the fraction.

$2\frac{2}{5} = 1 + 1 + \frac{2}{5}$

$= \frac{5}{5} + \frac{5}{5} + \frac{2}{5}$

$= \frac{12}{5}$

**Write each mixed number as an improper fraction.**

**1** $4\frac{1}{2}$

$4\frac{1}{2} = 1 + 1 + 1 + 1 + \frac{1}{2}$

$= \frac{\square}{2} + \frac{\square}{2} + \frac{\square}{2} + \frac{\square}{2} + \frac{1}{2}$

$= \frac{\square}{\square}$

**2** $2\frac{3}{4}$

$2\frac{3}{4} = 1 + 1 + \frac{3}{4}$

$= \frac{\square}{4} + \frac{\square}{4} + \frac{3}{4}$

$= \frac{\square}{\square}$

**3** $3\frac{2}{3}$

$3\frac{2}{3} = 1 + 1 + 1 + \frac{2}{3}$

$= \frac{\square}{3} + \frac{\square}{3} + \frac{\square}{3} + \frac{2}{3}$

$= \frac{\square}{\square}$

**4** $3\frac{2}{5}$

$3\frac{2}{5} = \_\_\_ + \_\_\_ + \_\_\_ + \frac{\square}{\square}$

$= \frac{\square}{\square} + \frac{\square}{\square} + \frac{\square}{\square} + \frac{\square}{\square}$

$= \frac{\square}{\square}$

**5** $2\frac{1}{8}$

$2\frac{1}{8} = \_\_\_ + \_\_\_ + \frac{\square}{\square}$

$= \frac{\square}{\square} + \frac{\square}{\square} + \frac{\square}{\square}$

$= \frac{\square}{\square}$

**6** $3\frac{5}{6}$

$3\frac{5}{6} = \_\_\_ + \_\_\_ + \_\_\_ + \frac{\square}{\square}$

$= \frac{\square}{\square} + \frac{\square}{\square} + \frac{\square}{\square} + \frac{\square}{\square}$

$= \frac{\square}{\square}$

**7** $5\frac{3}{4} =$ _____

**8** $8\frac{4}{5} =$ _____

**9** $6\frac{2}{3} =$ _____

## Check

Write each mixed number as an improper fraction.

**10** $5\frac{3}{4} =$ _____

**11** $6\frac{1}{8} =$ _____

**12** $4\frac{3}{5} =$ _____

Name _____

# Multiplication Facts

## Skill 36

Use strategies to recall multiplication facts.

**Use Facts You Know**
Use a fact you already know to find a fact you do not know.

If you know: $3 \times 8 = 24$

Then you also know: $8 \times 3 = 24$

If you know: $7 \times 5 = 35$

Then you can find: $7 \times 6 = \square$

**Think:** $7 \times 6$ is $(7 \times 5) + 7$, or $35 + 7$, or 42.

**So,** $7 \times 6 = 42$.

**Use Patterns**
If you use a multiplication table, you can look for patterns in products.

**Multiply by 9, 10, 11, 12**

**Facts for $9 \times 1$ to $9 \times 10$:** Ones digits decrease by 1. Tens digits increase by 1. The sum of the digits in the product is 9.

**Facts for $12 \times 0$ to $12 \times 9$:** Ones digits repeat: 0, 2, 4, 6, 8, ...

What other patterns can you find?

## Try These

Use strategies to multiply.

**1** Use facts you know.

$2 \times 8 =$ _____ So, $8 \times 2 =$ _____

$3 \times 8 =$ _____ So, $3 \times 9 =$ _____

**2** Use patterns.

$10 \times 1 =$ _____ $10 \times 2 =$ _____

$10 \times 3 =$ _____ $10 \times 4 =$ _____

$10 \times 5 =$ _____ $10 \times 6 =$ _____

Go to the next side.

Name _____ Skill _____

# Practice on Your Own

# Skill 36

**Use Facts You Know**

$6 \times 5 = \square$

If you know:

$5 \times 5 = 25$

**Then think:**

$6 \times 5 = (5 \times 5) + 5$, or 30

**So, $6 \times 5 = 30$.**

**Use Patterns**

Look for patterns to help you remember multiplication facts.

For products of 9 and 1 through 9, the digits of all multiples of 9 add up to 9.

Products of 10 end in 0.

For products of 11 and 1 through 9, you see the same digit in the tens and ones place.

Products of 12 end in 0, 2, 4, 6, or 8.

**Use facts you know.**

1. $4 \times 8 =$ _____
   So, $4 \times 9 =$ _____

2. $5 \times 8 =$ _____
   So, $5 \times 9 =$ _____

3. $6 \times 8 =$ _____
   So, $6 \times 9 =$ _____

4. $3 \times 5 =$ _____
   So, $3 \times 6 =$ _____

5. $2 \times 5 =$ _____
   So, $2 \times 6 =$ _____

6. $4 \times 3 =$ _____
   So, $4 \times 4 =$ _____

**Use patterns.**

7. $10 \times 5 =$ ___ $10 \times 6 =$ ___
   $10 \times 7 =$ ___ $10 \times 8 =$ ___

8. $11 \times 3 =$ ___ $11 \times 4 =$ ___
   $11 \times 5 =$ ___ $11 \times 6 =$ ___

9. $12 \times 4 =$ ___ $12 \times 5 =$ ___
   $12 \times 6 =$ ___ $12 \times 7 =$ ___

**Multiply.**

10. $8 \times 7 =$ _____

11. $10 \times 9 =$ _____

12. $9 \times 11 =$ _____

13. $12 \times 8$ _____

## Check

Multiply.

14. $4 \times 7 =$ _____

15. $6 \times 6 =$ _____

16. $10 \times 3 =$ _____

17. $11 \times 7 =$ _____

18. $10 \times 5 =$ _____

19. $7 \times 9 =$ _____

20. $5 \times 11 =$ _____

21. $12 \times 11 =$ _____

Name _____ Skill

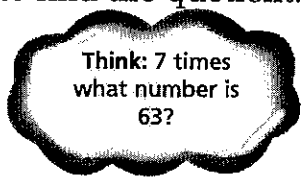
# Division Facts

## Skill 38

Division is the opposite or **inverse** of multiplication. Use this idea to help recall division facts.

$63 \div 7 = \square$

Think of a related multiplication fact to find the quotient.




$63 \div 7 = \square$

$7 \times 9 = 63$

**So,** $63 \div 7 = 9$.

Since multiplication is the inverse of division, you can use a multiplication table to find quotients for division facts.

To find $108 \div 12$:

1. Look down the factor column. Find 12.
2. Then look across the 12-row. Find 108.
3. Trace up from 108. Find the factor in the factor-row at the top. It is 9.

**So,** $12 \times 9 = 108$ and $108 \div 12 = 9$.

| x | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1 | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| 2 | 0 | 2 | 4 | 6 | 8 | 10 | 12 | 14 | 16 | 18 | 20 | 22 | 24 |
| 3 | 0 | 3 | 6 | 9 | 12 | 15 | 18 | 21 | 24 | 27 | 30 | 33 | 36 |
| 4 | 0 | 4 | 8 | 12 | 16 | 20 | 24 | 28 | 32 | 36 | 40 | 44 | 48 |
| 5 | 0 | 5 | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 | 55 | 60 |
| 6 | 0 | 6 | 12 | 18 | 24 | 30 | 36 | 42 | 48 | 54 | 60 | 66 | 72 |
| 7 | 0 | 7 | 14 | 21 | 28 | 35 | 42 | 49 | 56 | 63 | 70 | 77 | 84 |
| 8 | 0 | 8 | 16 | 24 | 32 | 40 | 48 | 56 | 64 | 72 | 80 | 88 | 96 |
| 9 | 0 | 9 | 18 | 27 | 36 | 45 | 54 | 63 | 72 | 81 | 90 | 99 | 108 |
| 10 | 0 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 | 110 | 120 |
| 11 | 0 | 11 | 22 | 33 | 44 | 55 | 66 | 77 | 88 | 99 | 110 | 121 | 132 |
| 12 | 0 | 12 | 24 | 36 | 48 | 60 | 72 | 84 | 96 | 108 | 120 | 132 | 144 |

### Try These

Use multiplication to divide.

**1** $48 \div 6 =$ ___

**Think:** $6 \times$ ___ is 48.

**So,** $48 \div 6 =$ ___.

**2** $81 \div 9 =$ ___

**Think:** $9 \times$ ___ is 81.

**So,** $81 \div 9 =$ ___.

**3** $55 \div 5 =$ ___

**Think:** $5 \times$ ___ is 55.

**So,** $55 \div 5 =$ ___.

**4** $84 \div 12 =$ ___

**Think:** $12 \times$ ___ is 84.

**So,** $84 \div 12 =$ ___.

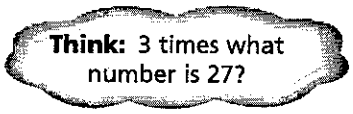
Go to the next side.

Name _____ Skill _____

# Practice on Your Own

# Skill 38

Find: $27 \div 3 = \square$




$3 \times 9 = 27$

**So,** $27 \div 3 = 9$.

Find: $48 \div 6 = \square$

Use the multiplication table.

- Look across the top row to 6.
- Then look down to 48.
- Trace back from 48 to find the factor at the far left. It is 8.

**So,** $6 \times 8 = 48$

and $48 \div 6 = 8$.

| x | 0 | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|---|
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1 | 0 | 1 | 2 | 3 | 4 | 5 | 6 |
| 2 | 0 | 2 | 4 | 6 | 8 | 10 | 12 |
| 3 | 0 | 3 | 6 | 9 | 12 | 15 | 18 |
| 4 | 0 | 4 | 8 | 12 | 16 | 20 | 24 |
| 5 | 0 | 5 | 10 | 15 | 20 | 25 | 30 |
| 6 | 0 | 6 | 12 | 18 | 24 | 30 | 36 |
| 7 | 0 | 7 | 14 | 21 | 28 | 35 | 42 |
| 8 | 0 | 8 | 16 | 24 | 32 | 40 | 48 |

Use multiplication to divide.

1. **Think:** $7 \times 4 =$ ___
   So, $28 \div 7 =$ ___
2. **Think:** $9 \times 7 =$ ___
   So, $63 \div 9 =$ ___
3. **Think:** $4 \times 10 =$ ___
   So, $40 \div 4 =$ ___
4. **Think:** $12 \times 4 =$ ___
   So, $48 \div 12 =$ ___
5. **Think:** $5 \times 6 =$ ___
   So, $30 \div 5 =$ ___.
6. **Think:** $7 \times 7 =$ ___
   So, $49 \div 7 =$ ___.
7. **Think:** $3 \times 12 =$ ___
   So, $36 \div 3 =$ ___.
8. **Think:** $9 \times 10 =$ ___
   So, $90 \div 9 =$ ___.

Divide.

9. $56 \div 8 =$ ___
10. $33 \div 3 =$ ___
11. $42 \div 7 =$ ___
12. $54 \div 9 =$ ___
13. $32 \div 8 =$ ___
14. $28 \div 7 =$ ___
15. $44 \div 4 =$ ___
16. $84 \div 7 =$ ___
17. $36 \div 9 =$ ___
18. $24 \div 3 =$ ___
19. $81 \div 9 =$ ___
20. $56 \div 7 =$ ___
21. $49 \div 7 =$ ___
22. $108 \div 12 =$ ___
23. $72 \div 12 =$ ___
24. $48 \div 12 =$ ___

## Check

Divide.

25. $35 \div 5 =$ ___
26. $22 \div 11 =$ ___
27. $99 \div 9 =$ ___
28. $60 \div 12 =$ ___

Name _____

# Multiply Decimals by Powers of 10

Skill 41

**Use a pattern to multiply a decimal by 10, 100, or 1,000.**

**Example A**
Multiply tenths.

$10 \times 0.3 = 3$ ← Multiply by 10. Decimal point moves **1** place to the right.

$100 \times 0.3\mathbf{0} = 30$ ← Multiply by 100. Decimal point moves **2** places to the right.

$1{,}000 \times 0.3\mathbf{00} = 300$ ← Multiply by 1,000. Decimal point moves **3** places to the right.

**Example B**
Multiply hundredths.

$10 \times 0.05 = 0.5$ ←1 place to the right

$100 \times 0.05 = 5$ ←2 places to the right

$1{,}000 \times 0.050 = 50$ ←3 places to the right

**Example C**
Multiply ones and tenths.

$10 \times 1.2 = 12$

$100 \times 1.20 = 120$

$1{,}000 \times 1.200 = 1{,}200$

## Try These

Find the product.

1. $10 \times 0.4 =$ _____
   $100 \times 0.40 =$ _____
   $1{,}000 \times 0.400 =$ _____

2. $10 \times 0.06 =$ _____
   $100 \times 0.06 =$ _____
   $1{,}000 \times 0.060 =$ _____

3. $10 \times 1.5 =$ _____
   $100 \times 1.50 =$ _____
   $1{,}000 \times 1.500 =$ _____

Go to the next side.

Skill _____

Name _____ Skill _____

# Practice on Your Own

## Skill 41

**Use a pattern to multiply by 10, 100, and 1,000.**

| | | |
|---|---|---|
| $0.8 \times 10 = 8$ | $0.09 \times 10 = 0.9$ | Multiply by 10. Decimal point moves 1 place to the right. |
| $0.80 \times 100 = 80$ | $0.09 \times 100 = 9$ | Multiply by 100. Decimal point moves 2 places to the right. |
| $0.800 \times 1{,}000 = 800$ | $0.090 \times 1{,}000 = 90$ | Multiply by 1,000. Decimal point moves 3 places to the right. |

**Find the product.**

1. $10 \times 0.5 =$ _____
   $100 \times 0.50 =$ _____
   $1{,}000 \times 0.500 =$ _____

2. $10 \times 0.18 =$ _____
   $100 \times 0.18 =$ _____
   $1{,}000 \times 0.180 =$ _____

3. $7.6 \times 10 =$ _____
   $7.60 \times 100 =$ _____
   $7.600 \times 1{,}000 =$ _____

**Find the product. Tell how many places you moved the decimal to the right.**

4. $10 \times 0.9 =$ _____
   Move _____ place(s).

5. $0.2 \times 100 =$ _____
   Move _____ place(s).

6. $1{,}000 \times 1.9 =$ _____
   Move _____ place(s).

7. $100 \times 2.4 =$ _____
   Move _____ place(s).

8. $1{,}000 \times 5.08 =$ _____
   Move _____ place(s).

9. $0.61 \times 10 =$ _____
   Move _____ place(s).

**Find the product.**

10. $5.7 \times 1{,}000 =$ _____

11. $1.23 \times 10 =$ _____

12. $0.07 \times 100 =$ _____

## Check

Find the product.

13. $10 \times 8.9 =$ _____

14. $1{,}000 \times 0.04 =$ _____

15. $100 \times 5.38 =$ _____

16. $1.6 \times 10 =$ _____

17. $8.39 \times 1{,}000 =$ _____

18. $2.7 \times 100 =$ _____

# Words for Operations

Skill 53

Write an algebraic expression for a word expression.

**Write an Algebraic Expression for a Word Expression**

Read the word expression.
Decide what operation to use.
Then write the algebraic expression.

- the sum of 6 and $n$
  addition
  $6 + n$
- the product of 8 and $n$
  multiplication
  $8n$

Remember there are different forms for multiplication:
$8 \times n$, $8n$

- the difference of 15 and $b$
  subtraction
  $15 - b$
- the quotient of 36 and $n$
  division
  $\frac{36}{n}$

Remember there are different forms for division:
$2\overline{)4}$, $4 \div 2$, $\frac{4}{2}$

**Think:** An algebraic expression can contain one or more numbers, operations, and variables.

**Write a Word Expression for an Algebraic Expression**

There are different phrases that you can use to represent algebraic expressions.

| Algebraic Expression | Word Expression |
|---|---|
| $2 + n$ | the sum of 2 and $n$<br>2 increased by $n$<br>2 plus $n$<br>2 more than $n$<br>a number $n$ plus 2 |
| $n - 6$ | the difference of $n$ and 6<br>$n$ decreased by 6<br>$n$ minus 6<br>6 less than a number $n$ |
| $xyz$ | the product of x, y, and z<br>x times y times z |
| $\frac{45}{a}$ | the quotient of 45 and $a$<br>45 divided by $a$ |

## Try These

Write the operation and algebraic expression for each word expression.

1. 5 **increased** by $t$

   Operation: _____

   Algebraic expression: _____

2. The **difference** of 12 and $p$.

   Operation: _____

   Algebraic expression: _____

Go to the next side.



Name _____ Skill _____

Name _____ Skill _____

# Practice on Your Own

# Skill 53

Sometimes there is more than one operation in an expression.

| Word Expression | Algebraic Expression |
|---|---|
| the difference of the product of $a$ and $b$ and 7<br>subtraction multiplication | $ab - 7$ |
| y less than the quotient of 64 and 8<br>division subtraction | $\frac{64}{8} - y$ |

Write the operation and algebraic expression for each word expression.

1. the **product** of $m$ and 2
Operation: _____
Algebraic expression: _____

2. 8 **less than** $x$
Operation: _____
Algebraic expression: _____

3. the **quotient** of 24 and $c$
Operation: _____
Algebraic expression: _____

4. the sum of 4 and $s$
Operation: _____
Algebraic expression: _____

5. 5 times $b$
Operation: _____
Algebraic expression: _____

6. $r$ decreased by 11
Operation: _____
Algebraic expression: _____

Write the letter of the word expression for the algebraic expression.

7. $\frac{t}{5}$ _____
**a.** the product of 5 and $t$

8. $5t$ _____
**b.** a number $t$ plus 5

9. $t + 5$ _____
**c.** $t$ decreased by 5

10. $t - 5$ _____
**d.** the quotient of $t$ and 5

Write the operation(s) and algebraic expression.

11. the sum of 3 and the quantity 8 times $p$
_____
_____

12. the difference of the product of 7 and $n$ and 4
_____
_____

13. 6 less than the quotient of $a$ and 4
_____
_____

## Check

Write the operation(s) and algebraic expression.

14. the sum of 17 and x
_____
_____

15. 8 less than the product of 29 and y
_____

Write the letter of the word expression for the algebraic expression.

16. $10m$ _____
**a.** 10 increased by $m$

17. $10 + m$
_____
**b.** 10 times $m$

Name _____ Skill

# Decimal Operations

## Skill 40

### Adding Decimals
Find 8.93 + 2.46.

Rewrite the problem so the decimal points are aligned.

```
  8.93
+2.46   add
 11.39
```

### Subtracting Decimals
Find 34.5 − 17.32.

Rewrite the problem so the decimal points are aligned.

```
  34.5
−17.32

  34.50   If necessary, add
−17.32    zeros as
 17.18    placeholders and
          regroup when
          subtracting.
```

### Multiplying Decimals
Find 3.24 × 0.3.

Rewrite the problem.

Determine the number of decimal places in the product.

```
  3.24  ←  2 decimal places
× 0.3   ←  +1 decimal place
 0.972  ←  3 decimal places
```

### Dividing Decimals
Find 1.75 ÷ 3.5.

Rewrite the problem.

$3.5\overline{)1.75}$ Change the divisor to a whole number and move the decimal point in the dividend.

$3.5\overline{)1.75}$

```
   0.5     Divided as you
35)17.5    would for whole
  175      numbers.
    0
```

## Try These

Solve.

**1** 17.23 + 54.39

```
 17.23
+54.39   Align decimals.
```

**2** 45.6 − 24.9

```
 45.6
−24.9   Align decimals.
```

**3** 4.23 × 1.2

```
  4.23  ←  ☐ decimal places
× 1.2   ←  +☐ decimal place
        ←  ☐ decimal places
```

**4** 6.11 ÷ 0.65

$0.65\overline{)6.11}$ Move the decimal point.

Go to the next side.

Name _____ Skill _____

# Practice on Your Own

# Skill 40

**Think:** To add and subtract decimals, align the decimal points.

**Think:** When multiplying decimals, determine the number of place values the product will have.

**Think:** When dividing decimals, remember to move the decimal point so you are dividing by a whole number.

**Solve.**

**1** $74.25 + 21.38$

$$\begin{array}{r} 74.25 \\ +21.38 \end{array}$$ align

**2** $2.17 \times 0.4$

$$\begin{array}{rl} 2.17 & \leftarrow \ \square \text{ decimal place} \\ \times\ 0.4 & \leftarrow \ +\square \text{ decimal place} \\ & \leftarrow \ \square \text{ decimal places} \end{array}$$

**3** $7.77 \div 2.1$

$2.1\overline{)7.77}$ move decimal

**Solve.**

**4** $9.73 + 3.688$ _____

**5** $80.2 - 4.57$ _____

**6** $6.45 \div 1.2$ _____

**7** $3.69 \div 0.4$ _____

**8** $6.1 \times 3.7$ _____

**9** $0.5 \times 0.85$ _____

## Check

**Solve.**

**10** $23.81 - 5.4$ _____

**11** $11.52 \div 3.2$ _____

**12** $37.4 + 8.01$ _____

**13** $9.71 - 3.226$ _____

**14** $0.75 \times 4.1$ _____

**15** $9.51 \times 0.7$ _____

Name _____ Skill _____

# Multiply Fractions

Skill 44

When you multiply two fractions less than one, the product is less than each of the factors. Find $\frac{2}{3}$ of $\frac{3}{8}$.

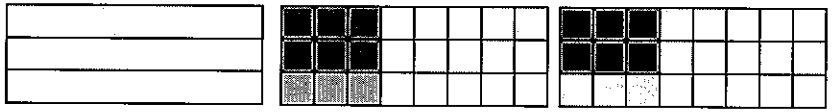
Remember: "Of" means multiply.

## Use models to find the product.

**Step 1** Divide the model into 3 equal rows. Shade two rows to show $\frac{2}{3}$.

**Step 2** Now divide the model into 8 equal columns. Shade 3 columns to show $\frac{3}{8}$.

**Step 3** The section where the shading overlaps is the product.



The model is now divided into 24 equal parts. The shading overlaps in 6 of 24 parts

$$\frac{2}{3} \times \frac{3}{8} = \frac{6}{24}$$

## Multiply to find the product.

**Step 1** Multiply the numerators. Multiply the denominators.

$$\frac{2}{3} \times \frac{3}{8} = \frac{2 \times 3}{3 \times 8} = \frac{6}{24}$$

Think: Is the fraction in simplest form?

**Step 2** Write the product in simplest form. Divide by the greatest common factor.

$\frac{6}{24}$

Factors of 6: 1, 2, 3, 6

Factors of 24: 1, 2, 3, 4, 6, 8, 12, 24

GCF = 6

Think: $6 \div 6 = 1$, $24 \div 6 = 4$

$\frac{6}{24} = \frac{1}{4}$

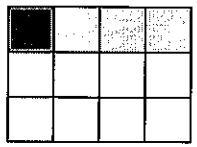
So, $\frac{2}{3} \times \frac{3}{8} = \frac{1}{4}$.

## Try These

Multiply. Write the answer in simplest form.

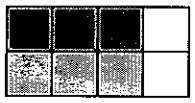
1. $\frac{1}{3} \times \frac{1}{4}$

$\frac{1}{3} \times \frac{1}{4} = \frac{1 \times 1}{3 \times 4} = \frac{\square}{\square}$



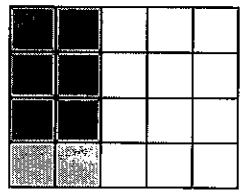
2. $\frac{1}{2} \times \frac{3}{4}$

$\frac{1}{2} \times \frac{3}{4} = \frac{1 \times 3}{2 \times 4} = \frac{\square}{\square}$



3. $\frac{3}{4} \times \frac{2}{5}$

$\frac{3}{4} \times \frac{2}{5} = \frac{3 \times 2}{4 \times 5} = \frac{\square}{\square} = \frac{\square}{\square}$



Go to the next side.

Name _____ Skill _____

# Practice on Your Own

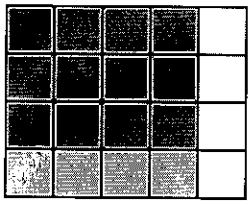
# Skill 44

Find $\frac{3}{4}$ of $\frac{4}{5}$.

**Think:**

To find the product $\frac{3}{4} \times \frac{4}{5}$:

- multiply the numerators
- multiply the denominators
- simplify the answer.



The shading overlaps in 12 of the 20 squares.

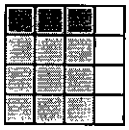
$$\frac{3}{4} \times \frac{4}{5} = \frac{3 \times 4}{4 \times 5} = \frac{12}{20} = \frac{3}{5}$$

Multiply. Write the answer in simplest form.

**1** $\frac{1}{2} \times \frac{1}{2}$

$$\frac{1}{2} \times \frac{1}{2} = \frac{1 \times 1}{2 \times 2} = \frac{\square}{\square}$$

**2** $\frac{1}{4} \times \frac{3}{4}$



$$\frac{1}{4} \times \frac{3}{4} = \frac{1 \times 3}{4 \times 4} = \frac{\square}{\square}$$

**3** $\frac{2}{3} \times \frac{3}{5}$

$$\frac{2}{3} \times \frac{3}{5} = \frac{2 \times 3}{3 \times 5} = \frac{\square}{\square} = \frac{\square}{\square}$$

**4** $\frac{1}{4} \times \frac{1}{5}$

$$\frac{1}{4} \times \frac{1}{5} = \frac{\square \times \square}{\square \times \square} = \frac{\square}{\square}$$

**5** $\frac{2}{3} \times \frac{1}{6}$

$$\frac{2}{3} \times \frac{1}{6} = \frac{\square \times \square}{\square \times \square} = \frac{\square}{\square}$$

**6** $\frac{4}{5} \times \frac{5}{6}$

$$\frac{4}{5} \times \frac{5}{6} = \frac{\square \times \square}{\square \times \square} = \frac{\square}{\square} = \frac{\square}{\square}$$

**7** $\frac{1}{5} \times \frac{1}{7} =$ _____

**8** $\frac{3}{8} \times \frac{1}{6} =$ _____

**9** $\frac{5}{9} \times \frac{3}{5} =$ _____

## Check

Multiply. Write the answer in simplest form.

**10** $\frac{1}{3} \times \frac{1}{9} =$ _____

**11** $\frac{3}{4} \times \frac{1}{6} =$ _____

**12** $\frac{2}{3} \times \frac{3}{8} =$ _____

Name _____ Skill _____

# Use of Parentheses

## Skill 50

Parentheses in an expression or in an equation means do the operation inside the parentheses first.

**Expressions**

Find the value of, or **evaluate**, the expressions. Compare the results. Are they the same?

| | $(3 \times 8) - 6$ | $3 \times (8 - 6)$ |
|---|---|---|
| **Step 1** Do the operation inside parentheses | $(3 \times 8) - 6$ ↓ $24 - 6$ | $3 \times (8 - 6)$ ↓ $3 \times 2$ |
| **Step 2** Do all other operations. | ↓ 18 | ↓ 6 |

You can see that the results are different. **So,** where parentheses are placed affects the value of some expressions.

**Equations**

You can solve some equations that contain parentheses by using properties.

**Distributive Property**

Find the value of $a$.

$(5 \times 2) + (5 \times 6) = 5 \times (a + 6)$

$(5 \times 2) + (5 \times 6) = 5 \times (2 + 6)$

So, $a = 2$.

**Associative Property**

Find the value of $c$.

$c \times (5 \times 9) = (3 \times 5) \times 9$

$3 \times (5 \times 9) = (3 \times 5) \times 9$

So, $c = 3$.

**Commutative Property**

Find the value of $p$.

$6 + (5 + 9) = (5 + 9) + p$

$6 + (5 + 9) = (5 + 9) + 6$

So, $p = 6$.

### Try These

Evaluate the expression

1. $(5 + 3) + 9$
   ↓
   ____ $+ 9$
   ↓
   ____

2. $4 \times (8 - 2)$
   ↓
   $4 \times$ ____
   ↓
   ____

Find the value of $a$.

3. $(3 \times 2) + (3 \times 4) = 3 \times (a + 4)$

   $(3 \times 2) + (3 \times 4) = 3 \times (2 + 4)$

   So, $a =$ ____

Use the Distributive Property of Multiplication to help you solve.

Go to the next side.

Name _____ Skill _____

# Practice on Your Own

# Skill 50

Do the operation inside the parentheses first.

**Evaluate.**

$4 \times (2 + 6 + 1)$

↓

$4 \times 9$

36

**Associative Property of Multiplication**

$6 \times (4 \times 5) = (6 \times 4) \times 5$

↓

$6 \times (4 \times 5) = (a \times 4) \times 5$

**So, $a = 6$**

**Distributive Property of Multiplication**

$(5 \times 3) + (5 \times 2) = b \times (3 + 2)$

↓

$(5 \times 3) + (5 \times 2) = 5 \times (3 + 2)$

**So, $b = 5$**

Evaluate the expression.

**1** $(4 + 6) + 3$

↓

____ $+ 3$

↓

____

**2** $(10 - 4) + 6$

↓

____ $+ 6$

↓

____

**3** $7 \times (3 \times 2)$

↓

$7 \times$ ____

↓

____

**4** $3 \times (9 - 6)$

↓

$3 \times$ ____

↓

____

**5** $(15 - 6) + 8$ ____

**6** $15 - (6 + 8)$ ____

**7** $(5 \times 3) \times 10$ ____

**8** $4 \times (5 \times 2)$ ____

**Solve the equation**

**9**

$(4 \times 6) + (4 \times 1) = c \times (6 + 1)$

$(4 \times 6) + (4 \times 1) = 4 \times (6 + 1)$

$c =$ ____

**10**

$a + (3 + 5) = (2 + 3) + 5$

$2 + (3 + 5) = (2 + 3) + 5$

$a =$ ____

**11**

$8 \times 6 \times 4 = p \times 8 \times 4$

$8 \times 6 \times 4 = 6 \times 8 \times 4$

$p =$ ____

**12**

$7 \times (6 + 2) = (b \times 6) + (b \times 2)$

$b =$ ____

**13**

$y + 6 + 9 = 9 + 6 + 1$

$y =$ ____

**14**

$(9 \times 5) \times 11 = 9 \times (5 \times c)$

$c =$ ____

## Check

Evaluate.

**15** $27 + (30 - 7)$ _____

**16** $35 - (24 + 11)$ _____

Find the value of $y$.

**17** $7 \times (6 + 2) = (y \times 6) + (y \times 2)$ $y =$ _____

Name _____ Skill _____

# Words for Operations

## Skill 53

Write an algebraic expression for a word expression.

**Write an Algebraic Expression for a Word Expression**

Read the word expression.
Decide what operation to use.
Then write the algebraic expression.

- the sum of 6 and $n$
  addition
  $6 + n$
- the product of 8 and $n$
  multiplication
  $8n$
- the difference of 15 and $b$
  subtraction
  $15 - b$
- the quotient of 36 and $n$
  division
  $\frac{36}{n}$

Remember there are different forms for multiplication:

$8 \times n$, $8n$

Remember there are different forms for division:

$2\overline{)4}$, $4 \div 2$, $\frac{4}{2}$

**Think:** An algebraic expression can contain one or more numbers, operations, and variables.

**Write a Word Expression for an Algebraic Expression**

There are different phrases that you can use to represent algebraic expressions.

| Algebraic Expression | Word Expression |
|---|---|
| $2 + n$ | the sum of 2 and $n$<br>2 increased by $n$<br>2 plus $n$<br>2 more than $n$<br>a number $n$ plus 2 |
| $n - 6$ | the difference of $n$ and 6<br>$n$ decreased by 6<br>$n$ minus 6<br>6 less than a number $n$ |
| $xyz$ | the product of x, y, and z<br>x times y times z |
| $\frac{45}{a}$ | the quotient of 45 and $a$<br>45 divided by $a$ |

### Try These

Write the operation and algebraic expression for each word expression.

1. 5 **increased** by $t$

   Operation: _____

   Algebraic expression: _____

2. The **difference** of 12 and $p$.

   Operation: _____

   Algebraic expression: _____

Go to the next side.

Name _____ Skill _____

# Practice on Your Own

## Skill 5B

Sometimes there is more than one operation in an expression.

| Word Expression | Algebraic Expression |
|---|---|
| the difference of the product of $a$ and $b$ and 7<br>subtraction multiplication | $ab - 7$ |
| y less than the quotient of 64 and 8<br>division subtraction | $\frac{64}{8} - y$ |

Write the operation and algebraic expression for each word expression.

1. the **product** of $m$ and 2
Operation: _____
Algebraic expression: _____

2. 8 **less than** $x$
Operation: _____
Algebraic expression: _____

3. the **quotient** of 24 and $c$
Operation: _____
Algebraic expression: _____

4. the sum of 4 and $s$
Operation: _____
Algebraic expression: _____

5. 5 times $b$
Operation: _____
Algebraic expression: _____

6. $r$ decreased by 11
Operation: _____
Algebraic expression: _____

Write the letter of the word expression for the algebraic expression.

7. $\frac{t}{5}$ _____
**a.** the product of 5 and $t$

8. $5t$ _____
**b.** a number $t$ plus 5

9. $t + 5$ _____
**c.** $t$ decreased by 5

10. $t - 5$ _____
**d.** the quotient of $t$ and 5

Write the operation(s) and algebraic expression.

11. the sum of 3 and the quantity 8 times $p$
_____
_____

12. the difference of the product of 7 and $n$ and 4
_____
_____

13. 6 less than the quotient of $a$ and 4
_____
_____

### Check

Write the operation(s) and algebraic expression.

14. the sum of 17 and x
_____
_____

15. 8 less than the product of 29 and y
_____

Write the letter of the word expression for the algebraic expression.

16. $10m$ _____
**a.** 10 increased by $m$

17. $10 + m$ _____
**b.** 10 times $m$

# Evaluate Expressions

**Skill 54**

You can **evaluate**, or find the value of, an expression by using the order of operations.

Order of Operations

1. Operate inside parentheses.
2. Evaluate terms with exponents.
3. Multiply and divide from left to right.
4. Add and subtract from left to right.

Evaluate $2b + 3$ for $b = {}^{-}4$.

$2b + 3$ Replace $b$ with ${}^{-}4$.

$2 \cdot {}^{-}4 + 3$ Multiply first.
**Think:** $2 \cdot {}^{-}4 = {}^{-}8$

${}^{-}8 + 3$ Then add.
**Think:** ${}^{-}8 + 3 = {}^{-}5$

${}^{-}5$

**So,** when $b = {}^{-}4$, the value of $2b + 3$ is ${}^{-}5$.

Evaluate $\frac{2a}{3} - 4$ for $a = 9$.

$\frac{2a}{3} - 4$ Replace $a$ with 9.

$\frac{2 \cdot 9}{3} - 4$ Multiply first.
**Think:** $2 \cdot 9 = 18$

$\frac{18}{3} - 4$ Then divide.
**Think:** $18 \div 3 = 6$

$6 - 4$ Finally, subtract.
**Think:** $6 - 4 = 2$

2

**So,** when $a = 9$, the value of $\frac{2a}{3} - 4$ is 2.

Evaluate $5(s + 3)^2$ for $s = 2$.

$5(s + 3)^2$ Replace $s$ with 2.

$5(2 + 3)^2$ Operate inside parentheses.
**Think:** $2 + 3 = 5$

$5 \cdot 5^2$ Evaluate $5^2$.
**Think:** $5^2 = 5 \times 5$, or 25

$5 \cdot 25$ Multiply.

125 **Think:** $5 \cdot 25 = 125$

**So,** when $s = 2$, the value of $5(s + 3)^2$ is 125.

## Try These

Evaluate the expression for the given value of the variable. Write each step.

**1** $a = 5$

$4a - 6$ Replace $a$ with 5.

$4 \cdot \square - 6$ Multiply.

____ Subtract.

____

The value of $4a - 6$ is ____.

**2** $b = 4$

$\frac{1 \cdot b}{2} + 1$ Replace $b$ with 4.

$\frac{1 \cdot \square}{2} + 1$ Multiply first.

$\frac{\square}{2} + 1$ Divide.

____ Add.

____

The value of $\frac{1 \cdot b}{2} + 1$ is ____.

**3** $c = 3$

$2(10 - c)^2$ Replace $c$ with 3.

$2(10 - \square)^2$ Operate inside parentheses.

____ Evaluate term with exponent.

____ Multiply.

____

The value of $2(10 - c)^2$ is ____.

Go to the next side.

Name _____ Skill _____

Name _____ Skill _____

# Practice on Your Own

# Skill 54

**Remember:**
When you multiply a negative number by a positive number, the product is a negative number.

Evaluate $(x + 3)^2 + 4xy$, for $x = 7$ and $y = {}^-2$.

| | |
|---|---|
| $(x + 3)^2 + 4xy$ <br> ↓ ↓ | Replace $x$ with 7 and $y$ with $^-2$. |
| $(7 + 3)^2 + 4 \cdot 7 \cdot {}^-2$ | Operate inside parentheses. |
| $10^2 + 4 \cdot 7 \cdot {}^-2$ | Evaluate $10^2$. |
| $100 + 4 \cdot 7 \cdot {}^-2$ | Multiply. |
| $100 + 28 \cdot {}^-2$ | Multiply. |
| $100 + {}^-56$ | Add. |
| 44 | |

The value of $(x + 3)^2 + 4xy$ is 44.

**Evaluate the expression for the given value of the variable. Write each step.**

**1** $m = 5$
$n = 2$
$7mn - 3$
$7 \cdot \square \cdot \square - 3$ Replace $m$ with 5 and $n$ with 2.
_____ Multiply.
_____ Subtract.

The value of $7mn - 3$ is _____.

**2** $p = {}^-8$
$5(p + 10)^2$
$5(\square + 10)^2$ Replace $p$ with $^-8$.
_____ Parentheses
_____ Exponents
_____ Multiply.

The value $5(p + 10)^2$ is _____.

**3** $t = 24$
$\frac{3t}{4} + 8$
**Think:**
_____ Multiply.
_____ Divide.
_____ Add.
Value: _____

**4** $z = {}^-4$
$3(z + 8)^2$
**Think:**
_____ Parentheses
_____ then
_____ exponents
Value: _____

**5** $p = 7, g = {}^-3$
$pg + 12$
_____
_____
_____
Value: _____

**Evaluate the expression for the given value of the variable.**

**6** $5c^2$ for $c = 3$
Value: _____

**7** $^-2ab + 3$ for $a = {}^-1$ and $b = {}^-6$
Value: _____

**8** $3(n + 5)^2$ for $n = 4$
Value: _____

## Check

Evaluate the expression for the given value of the variable.

**9** $20 + 5d$ for $d = {}^-2$
Value: _____

**10** $\frac{1}{2}xy + 7$ for $x = 2$ and $y = 8$
Value: _____

**11** $4(t - 1)^2$ for $t = 7$
Value: _____

# Evaluate Expressions

**Skill 54**

Name _____ Skill _____

You can **evaluate**, or find the value of, an expression by using the order of operations.

Order of Operations

1. Operate inside parentheses.
2. Evaluate terms with exponents.
3. Multiply and divide from left to right.
4. Add and subtract from left to right.

Evaluate $2b + 3$ for $b = {}^{-}4$.

$2b + 3$ Replace $b$ with $^{-}4$.

$\downarrow$

$2 \cdot {}^{-}4 + 3$ Multiply first.
**Think:** $2 \cdot {}^{-}4 = {}^{-}8$

${}^{-}8 + 3$ Then add.
**Think:** ${}^{-}8 + 3 = {}^{-}5$

${}^{-}5$

**So,** when $b = {}^{-}4$, the value of $2b + 3$ is $^{-}5$.

Evaluate $\frac{2a}{3} - 4$ for $a = 9$.

$\frac{2a}{3} - 4$ Replace $a$ with 9.

$\downarrow$

$\frac{2 \cdot 9}{3} - 4$ Multiply first.
**Think:** $2 \cdot 9 = 18$

$\frac{18}{3} - 4$ Then divide.
**Think:** $18 \div 3 = 6$

$6 - 4$ Finally, subtract.
**Think:** $6 - 4 = 2$

$2$

**So,** when $a = 9$, the value of $\frac{2a}{3} - 4$ is 2.

Evaluate $5(s + 3)^2$ for $s = 2$.

$5(s + 3)^2$ Replace $s$ with 2.

$\downarrow$

$5(2 + 3)^2$ Operate inside parentheses.
**Think:** $2 + 3 = 5$

$5 \cdot 5^2$ Evaluate $5^2$.
**Think:** $5^2 = 5 \times 5$, or 25

$5 \cdot 25$ Multiply.

$125$ **Think:** $5 \cdot 25 = 125$

**So,** when $s = 2$, the value of $5(s + 3)^2$ is 125.

## Try These

Evaluate the expression for the given value of the variable. Write each step.

**1** $a = 5$

$4a - 6$ Replace $a$ with 5.

$\downarrow$

$4 \cdot \square - 6$ Multiply.

____ Subtract.

____

The value of $4a - 6$ is ____.

**2** $b = 4$

$\frac{1 \cdot b}{2} + 1$ Replace $b$ with 4.

$\downarrow$

$\frac{1 \cdot \square}{2} + 1$ Multiply first.

$\frac{\square}{2} + 1$ Divide.

____ Add.

____

The value of $\frac{1 \cdot b}{2} + 1$ is ____.

**3** $c = 3$

$2(10 - c)^2$ Replace $c$ with 3.

$2(10 - \square)^2$ Operate inside parentheses.

____ Evaluate term with exponent.

____ Multiply.

____

The value of $2(10 - c)^2$ is ____.

Go to the next side.

Name _____ Skill _____

# Practice on Your Own

# Skill 54

**Remember:**
When you multiply a negative number by a positive number, the product is a negative number.

Evaluate $(x + 3)^2 + 4xy$, for $x = 7$ and $y = {}^-2$.

| | |
|---|---|
| $(x + 3)^2 + 4xy$ | Replace $x$ with 7 and $y$ with $^-2$. |
| $\downarrow \quad \downarrow$ | |
| $(7 + 3)^2 + 4 \bullet 7 \bullet {}^-2$ | Operate inside parentheses. |
| $10^2 + 4 \bullet 7 \bullet {}^-2$ | Evaluate $10^2$. |
| $100 + 4 \bullet 7 \bullet {}^-2$ | Multiply. |
| $100 + 28 \bullet {}^-2$ | Multiply. |
| $100 + {}^-56$ | Add. |
| 44 | |

The value of $(x + 3)^2 + 4xy$ is 44.

**Evaluate the expression for the given value of the variable. Write each step.**

**1** $m = 5$
$n = 2$

| | |
|---|---|
| $7mn - 3$ | Replace $m$ with 5 and $n$ with 2. |
| $7 \bullet \square \bullet \square - 3$ | |
| _____ | Multiply. |
| _____ | Subtract. |

The value of $7mn - 3$ is _____.

**2** $p = {}^-8$
$5(p + 10)^2$

| | |
|---|---|
| $5(\square + 10)^2$ | Replace $p$ with $^-8$. |
| _____ | Parentheses |
| _____ | Exponents |
| _____ | Multiply. |

The value $5(p + 10)^2$ is _____.

**3** $t = 24$
$\frac{3t}{4} + 8$

**Think:**
_____ Multiply.
_____ Divide.
_____ Add.

Value: _____

**4** $z = {}^-4$
$3(z + 8)^2$

**Think:**
_____ Parentheses
_____ then
_____ exponents

Value: _____

**5** $p = 7, g = {}^-3$
$pg + 12$

_____
_____
_____

Value: _____

**Evaluate the expression for the given value of the variable.**

**6** $5c^2$ for $c = 3$

Value: _____

**7** $^-2ab + 3$ for $a = {}^-1$ and $b = {}^-6$

Value: _____

**8** $3(n + 5)^2$ for $n = 4$

Value: _____

## Check

Evaluate the expression for the given value of the variable.

**9** $20 + 5d$ for $d = {}^-2$

Value: _____

**10** $\frac{1}{2}xy + 7$ for $x = 2$ and $y = 8$

Value: _____

**11** $4(t - 1)^2$ for $t = 7$

Value: _____

# Connect Words and Equations

## Skill 56

Name _____ Skill _____

You can write an algebraic equation for a word sentence. An algebraic equation is an equation that contains a variable.

Follow these steps to write an algebraic equation for a word sentence.

**Step 1** Read the sentence.

**Step 2** Identify operations, the unknown quantity, and the placement of the equal sign.

**Step 3** Choose a variable.

**Step 4** Write the equation.

**Remember: An equation is an algebraic or numerical sentence that shows two quantities are equal.**

| | |
|---|---|
| **Example 1**<br>A number increased by 4 is 12.<br>unknown addition equals<br>$n + 4 = 12$ | **Example 2**<br>The difference of a number and 15 is 7.<br>subtraction unknown equals<br>$a - 15 = 7$ |
| **Example 3**<br>The product of 2 and a number is 10.<br>multiplication unknown equals<br>$2b = 12$ | **Example 4**<br>A number divided by 6 is 3.<br>unknown division equals<br>$\frac{c}{6} = 3$ |

## Try These

Write the operation. Then write an algebraic equation for the word sentence.

1. Twelve plus a number is 17.
   Operation: _____
   Equation: _____

2. The difference of a number and 1 is 2.
   Operation: _____
   Equation: _____

3. A number times 3 is 15.
   Operation: _____
   Equation: _____

4. The quotient of 24 and a number is 6.
   Operation: _____
   Equation: _____

Go to the next side.

Name _____ Skill _____

# Practice on Your Own

# Skill 56

**Think:**
Use the word sentence to determine the operation, the unknown value, or variable, and the placement of the equal sign. Then write the equation.

| Word Sentence | Algebraic Equation |
|---|---|
| 10 is 3 more than a number.<br>equals addition unknown | $10 = x + 3$ |
| 4.5 less than a number is 3.2.<br>subtraction unknown equals | $x - 4.5 = 3.2$ |
| Twice a number is $^-56$.<br>multiplication unknown equals | $2x = {}^-56$ |
| A number divided by 6 is $\frac{1}{2}$.<br>unknown division equals | $\frac{x}{6} = \frac{1}{2}$ |

Write the operation. Then write an algebraic equation for the word sentence.

1. A number plus 8 is 19.
   Operation: _____
   Equation: _____

2. The difference of a number and 6.8 is 1.1.
   Operation: _____
   Equation: _____

3. The quotient of a number and 3 is 9.
   Operation: _____
   Equation: _____

4. Twice a number is 30.
   Operation: _____
   Equation: _____

5. 31 is 8 more than a number.
   Operation: _____
   Equation: _____

6. A number divided by 16 is $\frac{3}{8}$.
   Operation: _____
   Equation: _____

Write an algebraic equation for the word sentence.

7. A number increased by 12 is 45.
   _____

8. 16 less than a number is 5.
   _____

9. 7 times a number is $^-35$.
   _____

10. 28.9 is 7.2 more than a number.
    _____

11. The product of a number and 3 is 33.
    _____

12. The quotient of 8 and a number is $^-2$.
    _____

## Check

Write an algebraic equation for the word sentence.

13. 7 times a number is 84.
    _____

14. 19.2 decreased by a number is 6.7.
    _____

15. A number divided by 6 is $\frac{2}{3}$.
    _____

16. A number increased by 12 is 67.
    _____

17. 15 less than a number is 82.
    _____

18. 3 times a number is $^-36$.
    _____

# 6.RP.1 Answers

1. A
2. B
3. D
4. A
5. C, E
6. A, D, E
7. $\frac{5 \text{ cups of bread crumbs}}{9 \text{ pounds of ground beef}}$

   **Rubric**
   1 point for correct ratio

8. 4:16 or 4 to 16 or $\frac{4}{16}$

   **Rubric**
   1 point for finding the correct quantities;
   1 point for the correct ratio

9. The number of boys in fifth grade is 100, and the number of boys in sixth grade is $100 - 7 = 93$, for a total of $100 + 93 = 193$ boys in the middle school. The number of fifth grade girls is 110, and the number of sixth grade girls is $93 + 10 = 103$, for a total of $110 + 103 = 213$ girls. The ratio of girls to boys in the middle school is 213:193.

   **Rubric**
   1 point for correct answer; 2 points for showing appropriate work

10. a. 1:11

    b. $\frac{1}{11}$

    c. There are more students because there are 11 students for each teacher.

    **Rubric**
    a. 1 point
    b. 1 point
    c. 1 point for correct answer; 1 point for correct explanation

11. a. $1\frac{1}{2}$ cups of ingredients

    b. No; there is twice as much water for uncooked rice, but the amount of water is not twice the total amount of the ingredients. The ratio of cups of water to total cups of ingredients is $1:1\frac{1}{2}$.

    **Rubric**
    a. 1 point
    b. 1 point for knowing that the ratio in b is not correct; 1 point for giving the correct ratio

12. a. 3:5

    b. No; the ratio says that Erica wins 3 games for every 5 games played. It does not tell you the total number of games played.

    **Rubric**
    a. 1 point
    b. 1 point for correct answer; 1 point for appropriate explanation

# 6.RP.2 Answers

1. B
2. A
3. A
4. D, E
5. A, B
6. B
7. A
8. G
9. E
10. D

11. a. $\frac{180 \text{ students}}{20 \text{ teams}} = \frac{9 \text{ students}}{1 \text{ team}}$

    b. $\frac{180 \text{ students}}{15 \text{ teams}} = \frac{12 \text{ students}}{1 \text{ team}}$; there are 12 students on each team.

    **Rubric**

    a. 1 point

    b. 1 point

12. Kyle divided the numerator and denominator by 2 to find the unit rate. Kyle should have multiplied by 2 to find the price per pound.

$$\frac{\$2.98 \cdot 2}{\frac{1}{2} \text{ pound} \cdot 2} = \frac{\$5.96}{1 \text{ pound}}$$

    The ham is selling for $5.96 per pound.

    **Rubric**

    1 point for identifying the error; 1 point for the correct unit rate; 1 point for showing appropriate work

13. $\frac{\$5.90}{1 \text{ pound}} = \frac{\$5.90}{16 \text{ ounces}} \approx \frac{\$0.37}{1 \text{ ounce}}$

    **Rubric**

    1 point for answer;
    1 point for appropriate work

14. Wholesaler C has the lowest price per pound.

    Wholesaler A:

$$\frac{\$40.00}{10 \text{ pounds}} = \frac{\$40.00 \div 10}{10 \text{ pounds} \div 10} = \frac{\$4.00}{1 \text{ pound}}$$

    Wholesaler B:

$$\frac{\$45.00}{15 \text{ pounds}} = \frac{\$45.00 \div 15}{15 \text{ pounds} \div 15} = \frac{\$3.00}{1 \text{ pound}}$$

    Wholesaler C:

$$\frac{\$50.00}{20 \text{ pounds}} = \frac{\$50.00 \div 20}{20 \text{ pounds} \div 20} = \frac{\$2.50}{1 \text{ pound}}$$

    **Rubric**

    1 point for each computation; 1 point for identifying the wholesaler with the best price

15. John and Maria spent $4.25 per hour for the trip.

    John and Maria spent $9.00 + $5.00 + $3.00 = $17.00 for the trip.

    Their trip lasted 4.25 hours because they started at 11:30 A.M. and finished at 3:45 P.M.

    The ratio of money spent to time hiked is $\frac{\$17.00}{4.25 \text{ hours}}$ and the unit rate is

$$\frac{\$17.00}{4.25 \text{ hours}} = \frac{\$17.00 \div 4.25}{4.25 \text{ hours} \div 4.25} = \frac{\$4.00}{1 \text{ hour}}.$$

    **Rubric**

    1 point for the correct unit rate; 4 points for showing appropriate work

# 6.RP.3a Answers

1. A
2. C
3. C
4. A
5. a. Yes
   b. No
   c. Yes
   d. Yes
6.

| Fuel (kg) | 63 | 70 | 84 | 98 | 112 |
|---|---|---|---|---|---|
| Additive (g) | 27 | 30 | 36 | 42 | 48 |

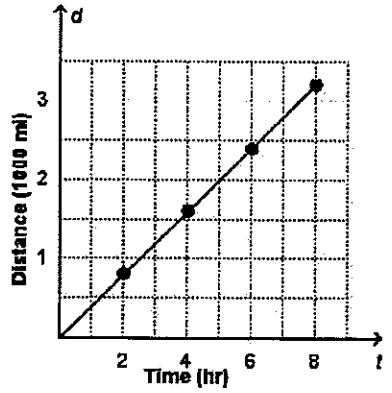
**Rubric**
1 point for each correct value

7. Option B
   Option A can travel 22 miles on 1 gallon, Option B can travel 23 miles on 1 gallon, and Option C can travel 20 miles on 1 gallon. The ratio of distance to fuel is highest for Option B.

   **Rubric**
   1 point for the correct option; 1 point for a correct explanation

8.

| Distance (miles) | 800 | 1600 | 2400 | 3200 |
|---|---|---|---|---|
| Time (hr) | 2 | 4 | 6 | 8 |




(Students may switch which quantity goes on which axis for full credit, as long as they apply their decision correctly.)

**Rubric**
1 point for each correct ordered pair in the table, 2 points for a correct graph

9. a.

| Distance (mi) | 50 | 100 | 150 | 200 | 250 |
|---|---|---|---|---|---|
| Time (hr) | 1 | 2 | 3 | 4 | 5 |

   b. The ratio of 250 miles to 5 hours would change.
   c. I would expect the ratio to be lower because the car would travel a smaller distance in one hour if it had to stop for repairs.

**Rubric**
a. 0.5 point for each entry in the table
b. 1 point for noting that the ratio of 250 miles to 5 hours would change
c. 2 points for explaining how the ratio would change and why

# 6.RP.3b Answers

1. B
2. D
3. A
4. D
5. A
6. a. The small truck traveled at 60 miles per hour, and the large truck traveled at 45 miles per hour.
   b. The trip took the small truck 3.75 hours and the large truck 5 hours.

   **Rubric**

   a. 0.5 point for each correct speed
   b. 0.5 point for each correct time
7. The two shoppers did not buy the same kind of meat; the first shopper paid \$3.29 per pound, and the second shopper paid \$4.19 per pound.

   **Rubric**

   1 point for the correct answer; 2 points for an appropriate explanation
8. a. No; Lupita paid \$2.40 per pound for her pretzels. Charles paid \$2.55 per pound for his pretzels. Lupita got a better deal because \$2.40 per pound is less than \$2.55 per pound.
   b. \$17.85

   **Rubric**

   a. 1 point for correct answer; 2 points for explanation
   b. 1 point for answer
9. Sam should rent the first car and bring \$70.60 for gas.

   The first car gets 15 miles per gallon, while the second car only gets 12 miles per gallon. Sam should choose the first car. Sam's estimate for how much he will pay for gas indicates a unit rate of \$3.53 per gallon. At 15 miles per gallon, Sam will need 20 gallons to make the 300-mile trip. So Sam should bring \$70.60 for gas.

   **Rubric**

   1 point for the correct car;

   1 point for correct amount of money for gas;

   3 points for appropriate explanation with necessary calculations
10. If Martha buys all the \$1.29 songs and 6 of the \$0.99 songs, she will be getting 9 songs for \$9.81. She will pay \$1.09 per song.

$$\frac{\$9.81}{9 \text{ songs}} = \frac{\$9.81 \div 9}{9 \text{ songs} \div 9} = \frac{\$1.09}{1 \text{ song}}$$

   If she buys the album, she will be getting 12 songs for \$9.99. She will pay \$0.83 per song.

$$\frac{\$9.96}{12 \text{ songs}} = \frac{\$9.96 \div 12}{12 \text{ songs} \div 12} = \frac{\$0.83}{1 \text{ song}}$$

   The whole album is a better deal in terms of price per song.

   **Rubric:**

   1 point for the answer;

   1 point for the price for just the songs she likes;

   1 point for each of the unit rates

# 6.RP.3c Answers

1. B
2. C
3. C
4. C
5. C, E
6. C
7. B
8. F
9. A
10. E

11. a. $\$20 \times \frac{4.75}{100} = \$0.95$

    b. $\$20 \times \frac{6}{100} = \$1.20$

    $\$1.20 - \$0.95 = \$0.25$

    She would pay \$0.25 more in sales tax in South Carolina.

    **Rubric**

    a. 1 point

    b. 2 points

12. a. 4,000; 400; 40

    b. When the percent is multiplied by 10, the resulting whole is divided by 10.

    c. 200; the percent changed from 2.5% to 25% (a multiplication by 10), so the whole, 2,000, will be divided by 10: 2,000 ÷ 10 = 200. So, 25% of 200 is 50.

    **Rubric**

    a. 1 point for each correct answer

    b. 1 point for the explanation

    c. 1 point for the explanation; 1 point for the answer

13. a. \$410

    b. Write 82% as a fraction with denominator 100. Then multiply by Jane's regular pay.

    $\frac{82}{100} \cdot 500 = 410$

    The answer, \$410, is the same as part a.

    c. To find $n$% of an amount $A$:

    $A - \frac{n}{100} \cdot A = A - \frac{nA}{100}$

    Also:

    $\left(\frac{100}{100} - \frac{n}{100}\right)A$

    Use the distributive property and simplify.

    $\left(\frac{100}{100} - \frac{n}{100}\right)A = \frac{100}{100} \cdot A - \frac{n}{100} \cdot A$

    $= A - \frac{nA}{100}$

    Both methods result in the expression $A - \frac{nA}{100}$.

    **Rubric**

    a. 1 point

    b. 1 point

    c. 4 points

# 6.RP.3d Answers

1. C
2. B
3. B
4. A
5. B, C
6. a. yes
   b. yes
   c. yes
   d. no
7. The chemist has about
   $4 \text{ fl oz} \cdot \frac{29.6 \text{ mL}}{1 \text{ fl oz}} = 118.4 \text{ mL}$, so he or she needs 500 mL − 118.4 mL = 381.6 mL more.

   **Rubric**
   1 point for correct answer; 1 point for appropriate work
8. Find the surface area of the box in square inches.
   $2(6 \text{ in.} \cdot 6 \text{ in.}) + 2(6 \text{ in.} \cdot 12 \text{ in.}) + 2(6 \text{ in.} \cdot 12 \text{ in.})$
   $= 2(36 \text{ in.}^2) + 2(72 \text{ in.}^2) + 2(72 \text{ in.}^2)$
   $= 72 \text{ in.}^2 + 144 \text{ in.}^2 + 144 \text{ in.}^2$
   $= 360 \text{ in.}^2$

   Convert the surface area to square centimeters. Multiply the surface area by two factors of $\frac{2.54 \text{ centimeters}}{1 \text{ inch}}$.

   Find the number of square meters.
   $360 \text{ in.}^2 \cdot \frac{2.54 \text{ cm}}{1 \text{ in.}} \cdot \frac{2.54 \text{ cm}}{1 \text{ in.}}$
   $\approx 2{,}323$ square centimeters

   **Rubric**
   1 point for the correct answer; 2 points for appropriate work
9. $12 \text{ feet} \cdot \frac{1 \text{ yard}}{3 \text{ feet}} = 4 \text{ yards}$;
   $15 \text{ feet} \cdot \frac{1 \text{ yard}}{3 \text{ feet}} = 5 \text{ yards}$;
   Area of floor = 4 yards • 5 yards = 20 square yards

   **Rubric**
   1 point for correct area; 1 point for appropriate work
10. The salesman was in error when he said there were 3 square feet in a square yard.

    Since 1 yard = 3 feet, 1 square yard is 3 feet • 3 feet = 9 square feet.

    The actual number of square yards is
    $270 \text{ square feet} \cdot \frac{1 \text{ square yard}}{9 \text{ square feet}}$
    $= 30$ square yards

    The actual cost is
    $30 \text{ square yards} \cdot \frac{\$12.00}{1 \text{ square yard}} = \$360.$

    **Rubric**
    2 points for identifying error; 2 points for calculating actual cost
11. a.

| Juice | Milliliters | Cups |
|---|---|---|
| Cranberry | 3,500 | 15 |
| Orange | 950 | 4 |
| Lemon | 240 | 1 |

    b. 1 quart of cranberry juice holds 4 cups, so $15 \text{ cups} \cdot \frac{1 \text{ quart}}{4 \text{ cups}} = 3\frac{3}{4} \text{ quarts}$.

    Because only whole quarts can be bought, 4 quarts of cranberry juice are needed, and one quarter of a quart (one cup) will be left over.

    **Rubric**
    a. 1 point for each missing table value
    b. 1 point for number of quarts; 1 point for noting there will be juice left over; 1 point for explanation

# 6.EE.1 Answers

1. B
2. D
3. A
4. B
5. B, D, E
6. G
7. F
8. H
9. A
10. C
11. Louis switched the bases and the exponents. He evaluated $5^3 + 3^6$ instead of $3^5 + 6^3$.

$$3^5 + 6^3 = 3 \times 3 \times 3 \times 3 \times 3 \times 6 \times 6 \times 6$$
$$= 459$$

**Rubric**

1 point for identifying mistake; 1 point for correct expansion; 1 point for correct answer

12.

$$11^2 \times 2^3 + 3^5 + 9^3$$
$$= (11 \times 11)(2 \times 2 \times 2) +$$
$$(3 \times 3 \times 3 \times 3 \times 3) + (9 \times 9 \times 9)$$
$$= (121)(8) + 243 + 729$$
$$= 968 + 243 + 729$$
$$= 1{,}940$$

**Rubric**

1 point for answer; 3 points for work

13. a. The area of the square is $8^2 = 8 \times 8 = 64$ square centimeters.
    b. The surface area of the cube is $6 \times 8^2 = 6 \times 8 \times 8 = 384$ square centimeters.
    c. The volume of the cube is $8^3 = 8 \times 8 \times 8 = 512$ cubic centimeters.

**Rubric**

a. 1 point for expression; 1 point for evaluating
b. 1 point for expression; 1 point for evaluating
c. 1 point for expression; 1 point for evaluating

14. a. Kerry puts $2 \times 2 = 2^2$ pennies into the jar on the second day, $2 \times 2 \times 2 = 2^3$ pennies into the jar on the third day, and $2 \times 2 \times 2 \times 2 = 2^4$ pennies into the jar on the fourth day.
    b. For each day, the exponent that 2 is being raised to increases by 1.
    c. On the seventh day, she will put $2^7$ pennies into the jar.
    $2^7 = 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 = 128$
    d. There will be \$2.54 in the jar at the end of the week.

**Rubric**

a. 1 point for each expression
b. 1 point
c. 1 point for expression; 1 point for expanding and evaluating
d. 1 point

# 6.EE.2a Answers

1. B
2. A
3. C
4. D
5. A, C, E
6. A, C, F
7. a. +
   b. −
   c. ÷
   d. −
   e. ×
   f. +
8. a. Clark made $r + 3$ hits in the first hour.
   b. Rebecca made $2c - 5$ hits in the second hour.

   **Rubric**

   a. 1 point
   b. 1 point
9. a. There are $t + 3$ lions.
   b. There are $2(t + 3)$ bears. ($2t + 6$ is also acceptable.)

   **Rubric**

   a. 1 point
   b. 1 point
10. a. $n + 3$
    b. $n + 3$
    c. $n + 3$
    d. The statements in parts a through c represent the same expression, $n + 3$.

    **Rubric**

    a. 1 point
    b. 1 point
    c. 1 point
    d. 1 point
11. a. The number of lights required in the room is $\frac{s}{5}$.
    b. The construction crew has $\frac{s}{5} + 10$ lights.
    c. The construction crew has $\frac{s}{5} - 15$ lights.
    d. The construction crew has $2\left(\frac{s}{5}\right)$ lights.

    **Rubric**

    a. 1 point
    b. 1 point
    c. 1 point
    d. 1 point
12. Sal gave Trudy $c - 3$ apple pies, which is 3 apple pies fewer than $c$ cherry pies. Sal should have given Trudy $c + 3$ apple pies.

    **Rubric**

    1 point for mistake; 1 point for correction

# 6.EE.2b Answers

1. A
2. C
3. B
4. D
5. a. Product
   b. Difference
   c. Sum
   d. Product
   e. Sum
   f. Quotient
6. The expression is $7(2 + x)$. The factors of the expression are 7 and $(2 + x)$.

   **Rubric**
   1 point for expression; 1 point for each factor
7. Possible answer:
   One sum is $14 + b$, with terms 14 and $b$. Another sum is $b + 27d$, with terms $b$ and $27d$.

   **Rubric**
   1 point for each sum; 1 point for each set of terms
8. The products are $14n$ and $6k$. The coefficients are 14 and 6.

   **Rubric**
   1 point for each product; 1 point for coefficients
9. a. Terms: $7x^2$, $2y$, and $-8$; Products: $7x^2$ and $2y$; Coefficients: 7 and 2
   b. First, evaluate $x^2$. Next, multiply 7 and $x^2$ and multiply 2 and $y$. Finally, add and subtract terms. The value of the expression at $x = 2$ and $y = -1$ is 18.

   **Rubric**
   a. 1 point for terms; 1 point for products; 1 point for coefficients
   b. 1 point for order of operations; 1 point for value of expression
10. No, this is not correct. Lara found the terms of the two sums. The factors of the product are $(5 + s)$ and $(k + 7)$.

    **Rubric**
    1 point for answer; 2 points for explaining the mistake; 1 point for each correct factor
11. a. The two sums are $56xy + 5$ and $-6x + \frac{y}{20}$.
    b. The terms of the expression are $56xy$, 5, $-6x$, and $\frac{y}{20}$.
    c. The product is $-6x$ and the coefficient is $-6$.
    d. The quotient is $\frac{y}{20}$.

    **Rubric**
    a. 1 point for each sum
    b. 1 point
    c. 1 point for product; 1 point for coefficient
    d. 1 point
12. Sums: $x + 5$, $y + 9$, $2 + x$, $y + 23$, and $(x + 5)(y + 9) + (2 + x)(y + 23)$
    Products: $(x + 5)(y + 9)$ and $(2 + x)(y + 23)$
    Factors: $(x + 5)$, $(y + 9)$, $(2 + x)$, and $(y + 23)$

    **Rubric**
    1 point for sums $x + 5$, $y + 9$, $2 + x$, and $y + 23$; 1 point for sum $(x + 5)(y + 9) + (2 + x)(y + 23)$; 1 point for products; 1 point for factors

# 6.EE.2c Answers

1. B
2. C
3. A
4. D
5. A, D, E
6. The surface area is 70 square feet.

$$\begin{aligned} A &= 2(5)(3)+2(5)(2.5)+2(3)(2.5) \\ &= 10(3)+10(2.5)+6(2.5) \\ &= 30+25+15 \\ &= 70 \end{aligned}$$

The volume is 37.5 cubic feet.

$$\begin{aligned} V &= (5)(3)(2.5) \\ &= 15(2.5) \\ &= 37.5 \end{aligned}$$

**Rubric**
1 point for surface area; 1 point for surface area work; 1 point for volume; 1 point for volume work

7. 76

**Rubric**
2 points

8. a. Mandy has $4q$ nickels and $q + 10$ dimes.
   b. If Mandy has \$5 in quarters, she has $5.00 \div 0.25 = 20$ quarters. So, she has $4q = 4(20) = 80$ nickels and $q + 10 = 20 + 10 = 30$ dimes.

**Rubric**
a. 1 point for each expression
b. 1 point for number of nickels; 1 point for number of dimes

9. At $k = 5$:

$$\begin{aligned} 11(5)+9-5^2-\frac{15}{5} &= 11(5)+9-25-\frac{15}{5} \\ &= 55+9-25-\frac{15}{5} \\ &= 55+9-25-3 \\ &= 64-25-3 \\ &= 36 \end{aligned}$$

**Rubric**
1 point for answer; 1 point for reasonable work

10. In the first line of Mark's work, he subtracted 2 from 12 before evaluating the exponent. The order of operations states that exponents should be evaluated first and that subtraction should be performed last.

$$\begin{aligned} 4(2)+12-2^2 &= 4(2)+12-4 \\ &= 8+12-4 \\ &= 20-4 \\ &= 16 \end{aligned}$$

**Rubric**
2 points for identifying mistake;
1 point for correcting mistake;
1 point for reasonable work

11. a. The volume of one tissue box is $4^3 = 64$ cubic inches.
    b. The volume of the crate will be equal to the total volume of 32 tissue boxes, which is $32 \times 64 = 2048$ cubic inches.
    c. No; if you only know the volume, you don't know how the boxes are arranged. They could be in one layer of 32 boxes, two layers of 16 boxes, etc.

**Rubric**
a. 1 point
b. 1 point for answer; 1 point for explanation
c. 1 point for answer; 1 point for explanation

12. a. $7m+10\left(\frac{d}{3}\right)$
    b. It will cost \$69.

$$\begin{aligned} 7(7)+10\left(\frac{6}{3}\right) &= 7(7)+10(2) \\ &= 49+20 \\ &= 69 \end{aligned}$$

c. It will cost $51.

$$7(3)+10\left(\frac{9}{3}\right)=7(3)+10(3)$$
$$=21+30$$
$$=51$$

**Rubric**

a. 1 point

b. 1 point for answer; 1 point for work

c. 1 point for answer; 1 point for work

# 6.EE.3 Answers

1. A
2. A
3. C
4. C
5. B, C, E
6. a.

$$\begin{aligned} 23y-(7x-2y)+x &= 23y-7x-(-2y)+x \\ &= 23y-7x+2y+x \end{aligned}$$

b. $23y-7x+2y+x=23y+2y-7x+x$

c. $23y+2y-7x+x=25y-6x$

**Rubric**

a. 1 point

b. 1 point

c. 1 point

7. Possible answer: Use the associative property of addition to move the parentheses to the right, and then combine like terms.

$$\begin{aligned} (2x+3y)+y &= 2x+(3y+y) \\ &= 2x+(4y) \\ &= 2x+4y \end{aligned}$$

**Rubric**

1 point for answer; 1 point for reasonable work; 1 point for using properties of operations correctly

8. a. $a+n+2a+10$

b. Possible answer: First, use the commutative property of addition to move $2a$ to the left of $n$, $a+n+2a+10=a+2a+n+10$. Then combine like terms to simplify as shown below.

$$\begin{aligned} a+n+2a+10 &= a+2a+n+10 \\ &= 3a+n+10 \end{aligned}$$

**Rubric**

a. 1 point

b. 1 point for answer; 1 point for reasonable work; 1 point for explaining use of properties of operations

9. a. Areas of faces: $ac$, $ac$, $bc$, $bc$, $ab$, $ab$

$$\begin{aligned} A &= ac+ac+bc+bc+ab+ab \\ &= 2ac+2bc+2ab \\ &= 2(ac+bc+ab) \end{aligned}$$

b. Substitute $a$ for $b$ and $c$ in the expression $2(ac+bc+ab)$.

$$\begin{aligned} A &= 2(ac+bc+ab) \\ &= 2(a \cdot a+a \cdot a+a \cdot a) \\ &= 2(a^2+a^2+a^2) \\ &= 2(3a^2) \\ &= (2 \cdot 3)a^2 \\ &= 6a^2 \end{aligned}$$

**Rubric**

a. 1 point for areas; 1 point for expression; 1 point for reasonable work

b. 1 point for answer; 1 point for reasonable work

10. Laura did not distribute the negative sign to $12y$ when evaluating $-4(2x+3y)$. Using the distributive property, $-4(2x+3y)=-8x-12y$.

$12x-18y-4(2x+3y)=$
$12x-18y-8x-12y$

Use the commutative property to move $-8x$ to the left of $-18y$. Then combine like terms.

$$\begin{aligned} 12x-18y-8x-12y &= 12x-8x-18y-12y \\ &= 4x-30y \end{aligned}$$

**Rubric**

1 point for identifying error; 1 point for correcting error; 1 point for correct equivalent expression; 1 point for reasonable work

# 6.EE.4 Answers

1. C
2. D
3. B
4. B, C, E
5. E
6. B
7. D
8. A
9. G
10. a. $p + t + 2(p + t)$
    b. $3(p + t)$
    c. Yes, Blaine and Tanya sold the same amount. They both sold $3p + 3t$ pumpkins and tomatoes.

    Blaine: $p+t+2(p+t)=p+t+2p+2t$
    $=p+2p+t+2t$
    $=3p+3t$

    Tanya: $3(p + t) = 3p + 3t$

    **Rubric**

    a. 1 point
    b. 1 point
    c. 1 point for answer; 1 point for explanation

11. a. $1\frac{3}{4}b+\frac{1}{2}b$
    b. $\frac{2}{3}b+1\frac{1}{3}b$
    c. Peter did add enough flour to his cookies, but he did not add enough sugar. He added $2b$ cups of sugar, but he needed $2\frac{2}{3}b$ cups.

$$1\frac{3}{4}b+\frac{1}{2}b=\frac{7}{4}b+\frac{2}{4}b$$
$$=\frac{9}{4}b$$
$$=2\frac{1}{4}b$$

$$\frac{2}{3}b+1\frac{1}{3}b=\frac{2}{3}b+\frac{4}{3}b$$
$$=\frac{6}{3}b$$
$$=2b$$

**Rubric**

a. 1 point
b. 1 point
c. 0.5 point for each simplification; 0.5 point for each answer

12. Possible solution:

First, use the distributive property and the associative property of multiplication to simplify $2(3 + 3x)$.

$(8x-12y)+y+2(3+3x)$
$=(8x-12y)+y+2\cdot3+2\cdot(3x)$
$=(8x-12y)+y+6+(2\cdot3)x$
$=(8x-12y)+y+6+6x$

Use the associative property of addition to move the parentheses to the right. Combine like terms inside the parentheses.

$(8x-12y)+y+6+6x$
$=8x+(-12y+y)+6+6x$
$=8x-11y+6+6x$

Use the commutative property of addition to move $8x$ to the right of 6.

$8x - 11y + 6 + 6x = -11y + 6 + 8x + 6x$

Finally, combine like terms.

$-11y + 6 + 8x + 6x = -11y + 6 + 14x$

So, the expression:
$(8x - 12y) + y + 2(3 + 3x)$
is equivalent to the expression:
$-11y + 6 + 14x$.

**Rubric**
1 point for answer; 3 points for using properties of operations correctly

13. a. $2(n + 1) + n + 3 + n + 1 + n + 1 + n + 2n$

b. $2(n + 1) + n + 3 + n + 1 + n + 1 + n + 2n$
$= 2n + 2 + n + 3 + n + 1 + n + 1 + n + 2n$
$= 2n + n + n + n + n + 2n + 2 + 3 + 1 + 1$
$= 8n + 7$

c. No, Nick's expression is not correct. His expression simplifies to $8n + 6$, and $8n + 6 \neq 8n + 7$.
$2n + 1 + 2n + 4n + 5$
$= 2n + 2n + 4n + 1 + 5$
$= 8n + 6$

**Rubric**
a. 1 point
b. 1 point for simplification; 2 points for reasonable work
c. 1 point for answer; 2 points for reasonable work

# 6.EE.5 Answers

1. B
2. C
3. B
4. B
5. A, C, D
6. $x = 4$:

$$7 \overset{?}{\leq} 5(4) - 16$$
$$7 \overset{?}{\leq} 20 - 16$$
$$7 \not\leq 4$$

4 is not a solution of $7 \leq 5x - 16$ because 7 is not less than or equal to 4.

**Rubric**
1 point for answer; 1 point for reasonable work

7. No. When substituting 7 for $x$, the left side of the inequality is equal to $9(7) - 3 = 63 - 3 = 60$, which is equal to 60 and produces a false statement.

**Rubric**
1 point for answer; 2 points for explanation

8. Substituting 1 for $x$ makes the equation true.

$x = 0$:

$$4(0) + 9 \overset{?}{=} 13$$
$$0 + 9 \overset{?}{=} 13$$
$$9 \neq 13$$

$x = 1$:

$$4(1) + 9 \overset{?}{=} 13$$
$$4 + 9 \overset{?}{=} 13$$
$$13 = 13$$

$x = 2$:

$$4(2) + 9 \overset{?}{=} 13$$
$$8 + 9 \overset{?}{=} 13$$
$$17 \neq 13$$

**Rubric**
1 point for answer; 1 point for reasonable work.

9. All values from the set of natural numbers except for 1 make the inequality true. When substituting 1 for $x$, the left side of the inequality is equal to $6 + 2(1) = 6 + 2 = 8$, which is not greater than 8. When substituting 2 for $x$, the left side of the inequality is equal to $6 + 2(2) = 6 + 4 = 10$, which is greater than 8. Since the left side of the inequality increases as the value of $x$ increases, the inequality is true for all natural numbers greater than 1.

**Rubric**
1 point for answer; 2 points for explanation

10. a. $300 = 22.5t + 75$
    b. Yes, Kyle will have enough to buy the computer if he saves for 10 days because 10 is a solution of the equation $300 = 22.5t + 75$.

$$300 \overset{?}{=} 22.5(10) + 75$$
$$300 \overset{?}{=} 225 + 75$$
$$300 = 300$$

**Rubric**
a. 2 points
b. 1 point for answer; 1 point for explanation

11. a. 1, 2, and 3 are solutions of $11 \geq 2x + 5$.

$$11 \overset{?}{\geq} 2(1) + 5 \qquad 11 \overset{?}{\geq} 2(2) + 5$$
$$11 \overset{?}{\geq} 2 + 5 \qquad 11 \overset{?}{\geq} 4 + 5$$
$$11 \geq 7 \qquad 11 \geq 9$$

$$11 \overset{?}{\geq} 2(3) + 5 \qquad 11 \overset{?}{\geq} 2(4) + 5$$
$$11 \overset{?}{\geq} 6 + 5 \qquad 11 \overset{?}{\geq} 8 + 5$$
$$11 \geq 11 \qquad 11 \not\geq 13$$

b. 1 and 2 are solutions of $11 > 2x + 5$.

$11 \overset{?}{>} 2(1)+5$ $\quad$ $11 \overset{?}{>} 2(2)+5$

$11 \overset{?}{>} 2+5$ $\quad$ $11 \overset{?}{>} 4+5$

$11 > 7$ $\quad$ $11 > 9$

$11 \overset{?}{>} 2(3)+5$ $\quad$ $11 \overset{?}{>} 2(4)+5$

$11 \overset{?}{>} 6+5$ $\quad$ $11 \overset{?}{>} 8+5$

$11 \not> 11$ $\quad$ $11 \not> 13$

c. The answer from part a includes 3 as a solution, while the answer from part b does not.

**Rubric**

a. 1 point for solutions; 1 point for reasonable work

b. 1 point for solutions; 1 point for reasonable work

c. 1 point

12. Jasmine is incorrect about 3 being a solution of the inequality $16 \geq 11x - 6$. The inequality is not true when substituting 3 for $x$:

$16 \overset{?}{\geq} 11(3)-6$

$16 \overset{?}{\geq} 33-6$

$16 \not\geq 27$

Jasmine is correct that 2 is a solution of the inequality $16 \geq 11x - 6$. The inequality is true when substituting 2 for $x$:

$16 \overset{?}{\geq} 11(2)-6$

$16 \overset{?}{\geq} 22-6$

$16 \geq 16$

**Rubric**

1 point for saying 3 is not a solution;
1 point for saying 2 is a solution; 2 points for explanation with work

# 6.EE.6 Answers

1. B
2. B
3. C
4. A
5. B, D
6. Possible answer: $3(q - 5)$; $q$ is the number of quarters Marie has.

   **Rubric**

   1 point for expression; 1 point for defining variable

7. a. $\frac{1}{2}y + 3$

   b. The value of $x$ is $6\frac{1}{2}$.

   $$\frac{1}{2}(7) + 3 = \frac{7}{2} + 3$$
   $$= \frac{7}{2} + \frac{6}{2}$$
   $$= \frac{13}{2} = 6\frac{1}{2}$$

   **Rubric**

   a. 1 point

   b. 1 point for answer; 1 point for reasonable work

8. a. $d - 11$; $d$ is the number of daisies planted.

   b. 7

   **Rubric**

   a. 1 point for expression; 1 point for defining variable

   b. 1 point

9. a. Adult tickets: $a$
   Student tickets: $3a$
   Senior tickets: $a - 8$

   b. $a + 3a + (a - 8) = 5a - 8$

   c. No, Elena only sells 67 tickets.
   $5(15) - 8 = 75 - 8 = 67$

   **Rubric**

   a. 1 point for each expression

   b. 0.5 point

   c. 1 point for answer; 0.5 point for work

10. a. Let $s$ be the total number of shells.

    First pile: $\frac{s}{2}$ shells

    Second pile: $\frac{s}{2} - 10$ shells

    Third pile:

    $$s - \left(\frac{s}{2} + \left(\frac{s}{2} - 10\right)\right) = s - \left(\frac{s}{2} + \frac{s}{2} - 10\right)$$
    $$= s - (s - 10)$$
    $$= s - s + 10$$
    $$= 10 \text{ shells}$$

    b. The students collected 44 shells.
    First way: Use the expressions from part a. If the first pile contains 22 shells, the second pile contains 10 fewer than the first pile, or $22 - 10 = 12$ shells. The third pile contains 10 shells. The total number of shells the students collected is the sum of 22, 12, and 10, or $22 + 12 + 10 = 44$ shells.
    Second way: Use the information given about the first pile. The first pile contains half as many shells as the number the students collected. So, the total number of shells is double the amount in the first pile, $2 \cdot 22$, or 44 shells.

    **Rubric**

    a. 1 point for each expression; 1 point for defining variable

    b. 1 point for total shells; 1 point for each method explanation

# 6.EE.7 Answers

1. B
2. D
3. C
4. A
5. $3+x=9$

   $3-3+x=9-3$

   $x=6$

   **Rubric**

   1 point for answer; 1 point for reasonable work

6. The equation $3\frac{1}{4}+h=4\frac{1}{8}$ models the situation.

   $3\frac{1}{4}+h=4\frac{1}{8}$

   $\frac{13}{4}+h=\frac{33}{8}$

   $\frac{13}{4}-\frac{13}{4}+h=\frac{33}{8}-\frac{13}{4}$

   $h=\frac{33}{8}-\frac{26}{8}$

   $h=\frac{7}{8}$

   The flower grew $\frac{7}{8}$ inch during the week.

   **Rubric**

   1 point for equation; 1 point for solving the equation; 1 point for stating how much the flower grew

7. Define $n$ to be the other number in the sum.

   $n+6=23$

   $n+6-6=23-6$

   $n=17$

   **Rubric**

   1 point for answer; 1 point for equation; 1 point for reasonable work

8. a. $1.5r=72$

   b. 48 miles per hour

   $1.5r=72$

   $\frac{1.5r}{1.5}=\frac{72}{1.5}$

   $r=48$

   **Rubric**

   a. 1 point

   b. 1 point for answer; 1 point for reasonable work

9. a. First, convert $\frac{1}{4}$ gallon to cups.

   $\frac{1}{4}\text{ gallon}\left(\frac{16\text{ cups}}{1\text{ gallon}}\right)=\frac{1}{4}(16)\text{ cups}=4\text{ cups}$

   Define $m$ to be the number of batches of muffins Kirk made.

   $\frac{2}{3}m=4$

   $\frac{3}{2}\cdot\frac{2}{3}m=\frac{4}{1}\cdot\frac{3}{2}$

   $m=\frac{12}{2}$

   $m=6$

   Kirk made 6 batches of muffins.

   b. Define $p$ to be the price per batch of muffins.

   $6p=108$

   $\frac{6p}{6}=\frac{108}{6}$

   $p=18$

   Kirk earned $18.00 per batch.

   **Rubric**

   a. 1 point for unit conversion; 1 point for equation; 1 point for answer; 1 point for showing work

   b. 1 point for equation; 1 point for answer; 1 point for showing work

10. Lauren added $\frac{4}{5}$ to both sides instead of subtracting $\frac{4}{5}$ from both sides.

$$\frac{4}{5}+x=\frac{13}{5}$$
$$\frac{4}{5}-\frac{4}{5}+x=\frac{13}{5}-\frac{4}{5}$$
$$x=\frac{9}{5}$$

**Rubric**
2 points for explanation of mistake;
1 point for correct answer; 1 point for reasonable work

11. a. $7s = 315$

b. Adam saves $45 each week.

$$7s=315$$
$$\frac{7s}{7}=\frac{315}{7}$$
$$s=45$$

c. Adam needs to save $450 – $315 = $135 more to buy the computer. Let $w$ be the additional number of weeks Adam must save.

$$45w=135$$
$$\frac{45w}{45}=\frac{135}{45}$$
$$w=3$$

Adam must save for 3 more weeks to buy the computer.

**Rubric**

a. 1 point

b. 1 point for answer; 1 point for reasonable work

c. 1 point for answer; 1 point for equation; 1 point for reasonable work

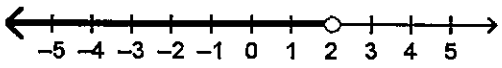
# 6.EE.8 Answers

1. D
2. C
3. D
4. C
5. A, C, D
6. $c > 14.5$, where $c$ is the total cost.

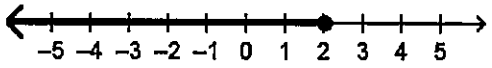
   **Rubric**
   2 points
7. The values graphed on the number line are all numbers less than 11.

   These values are the solutions of $x < 11$.

   The inequality has infinitely many solutions.

   **Rubric**
   1 point for description; 1 point for inequality; 1 point for infinitely many
8. 


   represents the solutions of $x < 2$.

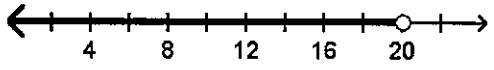
   


   represents the solutions of $x \leq 2$.

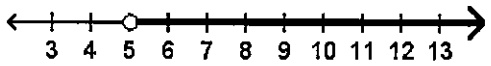
   The solutions of both include all values less than 2. The solutions of $x < 2$ do not include 2, but 2 is a solution of $x \leq 2$.

   **Rubric**
   1 point for each graph; 1 point for similarity; 1 point for difference
9. Keith wrote the correct inequality, but he did not graph the solutions correctly. Numbers less than 4 are to the left of 4 on the number line, not to the right.

   **Rubric**
   1 point for identifying mistake; 2 points for explanation
10. a. $n < 20$

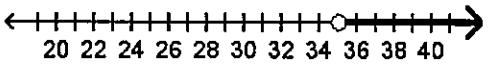
    


    b. $m > 5$


    c. The solutions of $n < 20$ are all numbers less than 20, and the solutions to $m > 5$ are all numbers greater than 5. The common solutions of the inequalities are all numbers between, but not equal to, 5 and 20.

    **Rubric**
    a. 1 point for inequality; 1 point for graph
    b. 1 point for inequality; 1 point for graph
    c. 1 point for description; 1 point for common values
11. a. The inequality $d > 35$, where $d$ is the number of miles Savannah commutes to work, represents the situation.

    b. 


    c. No, because 35 is not a solution of $d > 35$.

    **Rubric**
    a. 1 point
    b. 1 point
    c. 1 point for answer; 1 point for explanation
12. a. $s \geq 31$
    b. Liam wants to save as much as or more than \$31.
    c. No, every solution does not represent a realistic amount. The amounts will get too large to be realistic amounts of money for Liam to save. Also, Liam cannot save anything smaller than a penny, so the graph will not be a solid line.

    **Rubric**
    a. 1 point
    b. 1 point
    c. 1 point for answer; 2 points for explanation

# 6.EE.9 Answers

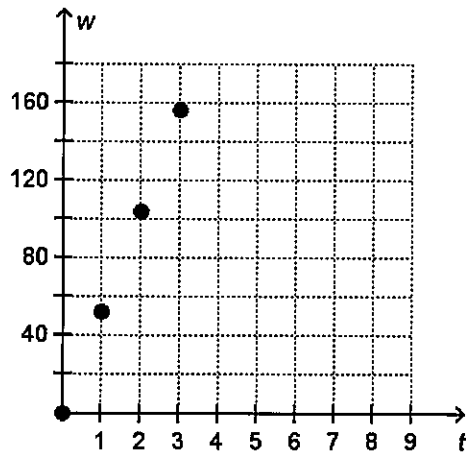
1. B
2. D
3. B
4. B, C, E
5. $c = 6b + 2.5$; the dependent variable is the total cost of the books $c$, and the independent variable is the number of books bought $b$. The total cost of the books increases by \$6.00 for each book bought.

   **Rubric**
   1 point for equation;
   2 points for explanation
6. The cost increases by \$0.50 for every pencil bought; $c = 0.5p$.

   (Also correct: The number of pencils bought increases by 2 for every \$1.00 spent; $p = 2c$.)

   **Rubric**
   1 point for relationship;
   1 point for equation
7. a. The independent variable is $t$, and the dependent variable is $w$. The number of words typed increases by 52 over every minute spent typing.

   b.




   c. $w = 52t$

   **Rubric**
   a. 1 point for each variable
   b. 2 points
   c. 2 points

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Our Students. Their Moment.

# New York State Testing Program
# Grade 6 Common Core
# Mathematics Test

## Released Questions

## June 2017

New York State administered the Mathematics Common Core Tests in May 2017 and is now making approximately 75% of the questions from these tests available for review and use.

The scoring rubric for short and extended constructed-response questions can be found in the grade-level Educator Guides at https://www.engageny.org/resource/test-guides-english-language-arts-and-mathematics.

**New York State P-12 Learning Standards Alignment**

The alignment(s) to the New York State P-12 Learning Standards for Mathematics is/are intended to identify the primary analytic skills necessary to successfully answer each question. However, some questions measure proficiencies described in multiple standards, including a balanced combination of procedure and conceptual understanding. For example, two-point and three-point constructed-response questions require students to show an understanding of mathematical procedures, concepts, and applications.

***These Released Questions Do Not Comprise a "Mini Test"***

To ensure future valid and reliable tests, some content must remain secure for possible use on future exams. As such, this document is *not* intended to be representative of the entire test, to show how operational tests look, or to provide information about how teachers should administer the test; rather, its purpose is to provide an overview of how the test reflects the demands of the New York State P-12 Learning Standards.

The released questions do not represent the full spectrum of the standards assessed on the State tests, nor do they represent the full spectrum of how the standards should be taught and assessed in the classroom. It should not be assumed that a particular standard will be measured by an identical question in future assessments. Specific criteria for writing test questions, as well as additional assessment information, are available at http://www.engageny.org/common-core-assessments.

Developed and published under contract with the New York State Education Department by Questar Assessment Inc., 5550 Upper 147th Street West, Minneapolis, MN 55124. 

**1** A bakery sells 5 apple muffins for every 2 bran muffins sold. Which table shows this ratio?

A

| Apple | Bran |
|---|---|
| 5 | 2 |
| 10 | 12 |
| 20 | 22 |

C

| Apple | Bran |
|---|---|
| 5 | 2 |
| 18 | 8 |
| 20 | 10 |

B

| Apple | Bran |
|---|---|
| 10 | 4 |
| 15 | 6 |
| 35 | 14 |

D

| Apple | Bran |
|---|---|
| 20 | 4 |
| 30 | 6 |
| 40 | 8 |

**2** In which set do all of the values make the inequality $2x - 1 < 10$ true?

**A** {10, 15, 20}

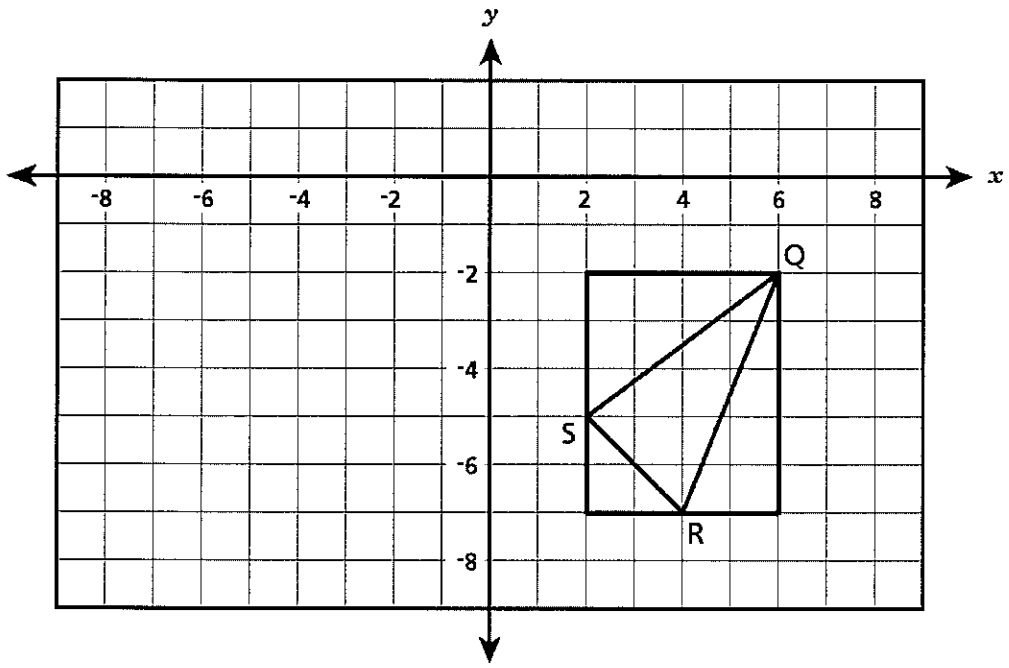
**B** {5, 7, 9}

**C** {4, 6, 8}

**D** {2, 3, 4}

***GO ON***

**9** Triangle QRS, with vertices Q(6, –2), R(4, –7), and S(2, –5), is drawn inside a rectangle, as shown below.




What is the area, in square units, of triangle QRS?

A 7

B 10

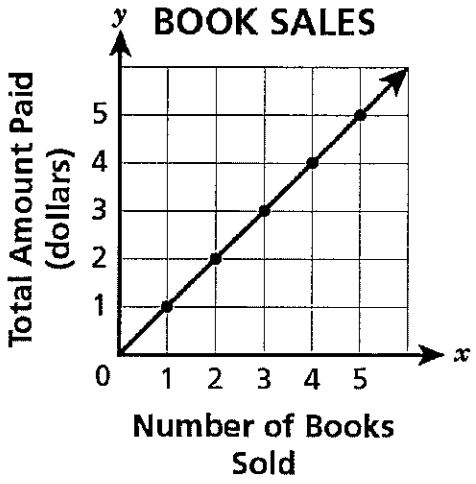
C 13

D 18

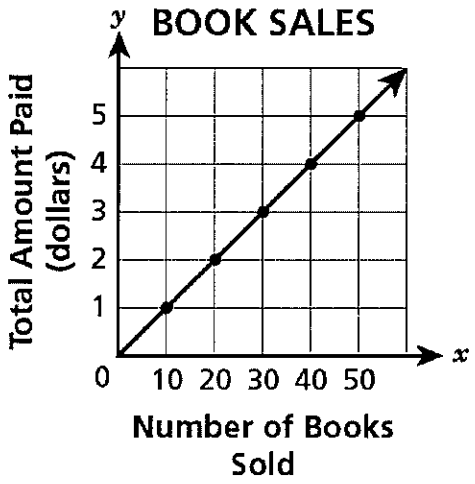
**GO ON**

**13** A bookstore is selling books for $10 each. Which graph shows the relationship between the number of books, $x$, the store sold and the total amount of money, $y$, paid from the book sales?

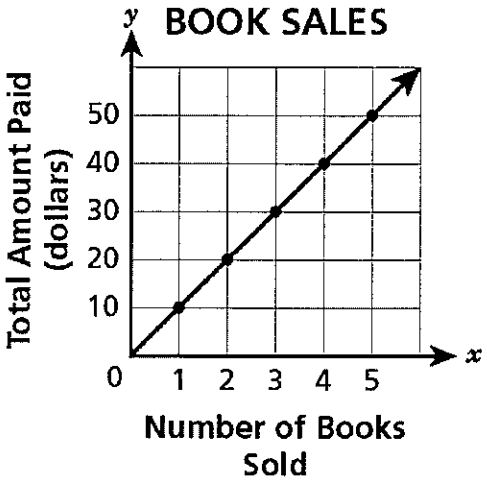
A



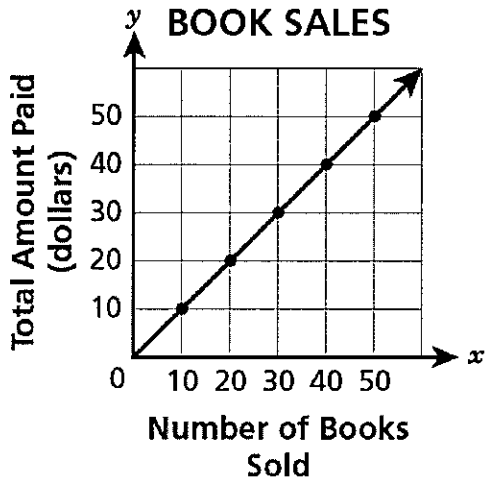

C




B




D



**16** George has $23 to spend on art supplies. He wants to buy markers, paper, and glue. If the total cost of the markers and paper is more than $14, which inequality represents the dollar amount, $p$, George can spend on glue?

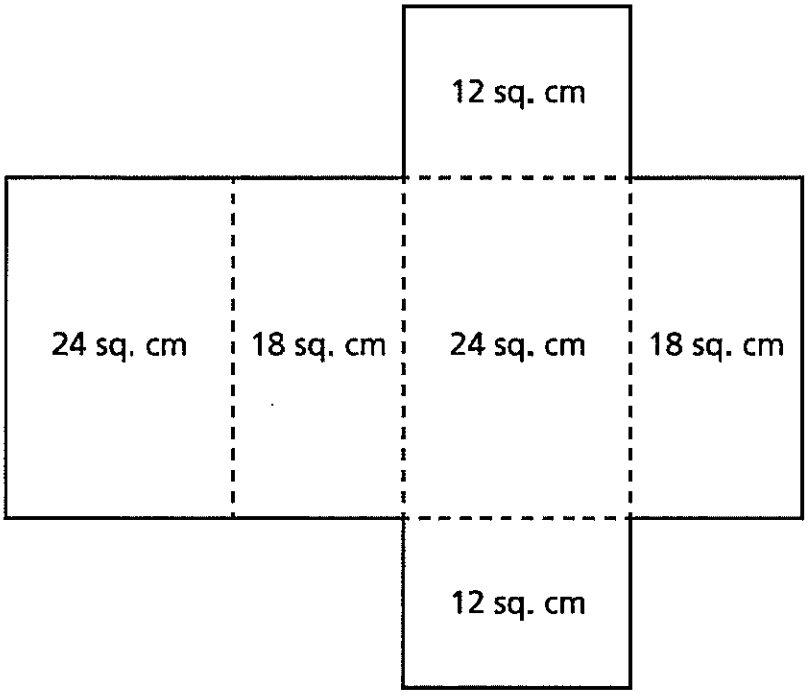
A $p < 9$

B $p > 9$

C $p < 37$

D $p > 37$

**17** The net of a rectangular prism is shown below. The surface area of each face is labeled.




Which values represent the dimensions, in centimeters, of the rectangular prism?

A 12, 18, 24

B 3, 4, 8

C 3, 4, 6

D 2, 9, 12

**GO ON**

**20** Jason will use a $\frac{1}{3}$-gallon pitcher to fill an empty $\frac{3}{4}$-gallon water jug. How much water will he need in order to completely fill the water jug?

A between 1 and 2 full pitchers

B between 2 and 3 full pitchers

C about $\frac{1}{2}$ of a full pitcher

D about $\frac{1}{4}$ of a full pitcher

**25** Which pair of expressions is equivalent for any variable value greater than zero?

**A** $3(x + 2)$ and $3x + 2$

**B** $4d + 2e$ and $8d + e$

**C** $f + f + f + g$ and $3fg$

**D** $b + b + 3c$ and $2b + 3c$

**26** What is the greatest common factor of 42 and 84?

**A** 7

**B** 21

**C** 42

**D** 84

**STOP**

Name: _____

# New York State Testing Program

# 2017 Common Core Mathematics Test Book 2

# Grade 6

## May 2–4, 2017

Released Questions

# Grade 6 Mathematics Reference Sheet

## *CONVERSIONS*

1 inch = 2.54 centimeters
1 meter = 39.37 inches
1 mile = 5,280 feet
1 mile = 1,760 yards
1 mile = 1.609 kilometers

1 kilometer = 0.62 mile
1 pound = 16 ounces
1 pound = 0.454 kilogram
1 kilogram = 2.2 pounds
1 ton = 2,000 pounds

1 cup = 8 fluid ounces
1 pint = 2 cups
1 quart = 2 pints
1 gallon = 4 quarts
1 gallon = 3.785 liters
1 liter = 0.264 gallon
1 liter = 1,000 cubic centimeters

## *FORMULAS*

| | |
|---|---|
| **Triangle** | $A = \frac{1}{2}bh$ |
| **Right Rectangular Prism** | $V = Bh$ or $V = lwh$ |

# Book 2

## TIPS FOR TAKING THE TEST

Here are some suggestions to help you do your best:

- Read each question carefully and think about the answer before choosing your response.
- You have been provided with mathematics tools (a ruler, a protractor, and a calculator) and a reference sheet to use during the test. It is up to you to decide when each tool and the reference sheet will be helpful. You should use mathematics tools and the reference sheet whenever you think they will help you to answer the question.

**29** The surface area, $S$, of a right rectangular prism with length $l$, width $w$, and height $h$ can be found using the formula below.

$$S = 2(lw + wh + hl)$$

What is the surface area, in square inches, of a prism with a length of 12 inches, a width of 9 inches, and a height of 2 inches?

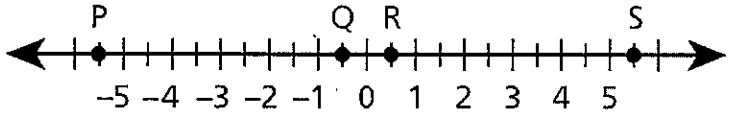
**A** 300

**B** 258

**C** 150

**D** 92

**30** Which point on the number line below represents the number opposite the number $-5\frac{1}{2}$?




**A** point P

**B** point Q

**C** point R

**D** point S

**36** A triangle has vertices on a coordinate grid at points J(−1, 5), K(4, 5), and L(4, −2). What is the length, in units, of $\overline{KL}$?

**A** 3

**B** 7

**C** 8

**D** 11

**37** Rosa has a goal of running a total of 100 miles this month. Each day that she ran, she ran 5 miles. Which expression could Rosa use to determine how many miles she has left to run after running for $d$ days?

**A** $100 - 5d$

**B** $5d + 100$

**C** $\frac{100}{5d}$

**D** $5d$

**GO ON**

**40** Steve ordered plastic cases for storing his baseball cards. Each case has a length of 12 centimeters, a width of 6.5 centimeters, and a height of 1.25 centimeters. What is the volume, in cubic centimeters, of one baseball card case?

A 39.5

B 97.5

C 118.5

D 202.25

**41** Kim rode her bicycle 135 miles in 9 weeks, riding the same distance each week. Eric rode his bicycle 102 miles in 6 weeks, riding the same distance each week. Which statement correctly compares the number of miles per week they rode?

A Eric rode 2 more miles per week than Kim rode.

B Kim rode 3 more miles per week than Eric rode.

C Kim rode 11 more miles per week than Eric rode.

D Eric rode 17 more miles per week than Kim rode.

**43** The two expressions below are equivalent.

$y(2.5 + 7) + y - 2$

$10.5y - 2$

Which statement **best** explains why the expressions are equivalent?

**A** The expressions have the same value for any value of $y$.

**B** The expressions have the same value for only whole number values of $y$.

**C** The expressions have the same value only when $y$ is an odd number.

**D** The expressions have the same value only when $y$ is an even number.

**44** Two whole numbers have a least common multiple of 60.

- Each number is less than or equal to 12.
- The greatest common factor of the two numbers is 2.

What are the two numbers?

**A** 6 and 10

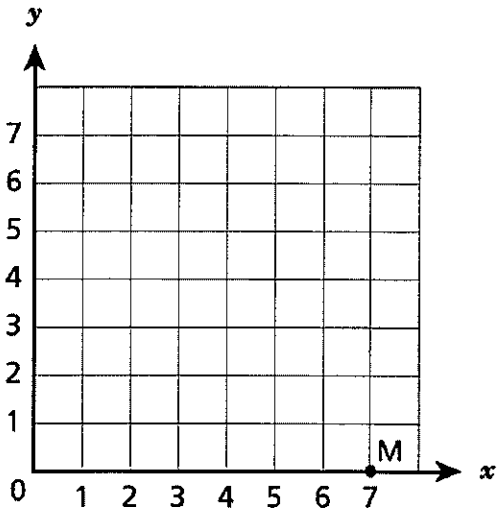
**B** 5 and 12

**C** 10 and 12

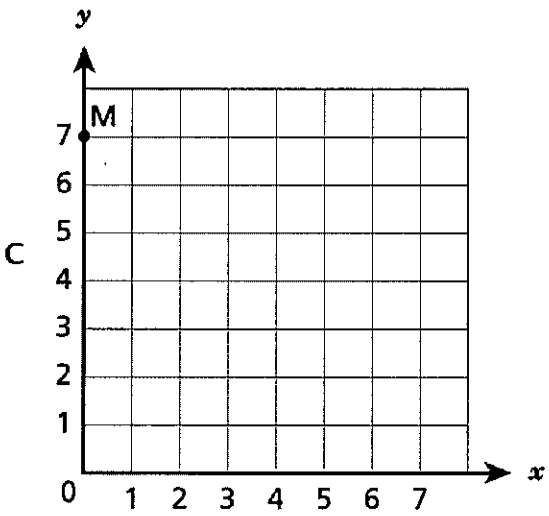
**D** 12 and 15

**46** Which coordinate grid shows point M plotted at (4, 3)?

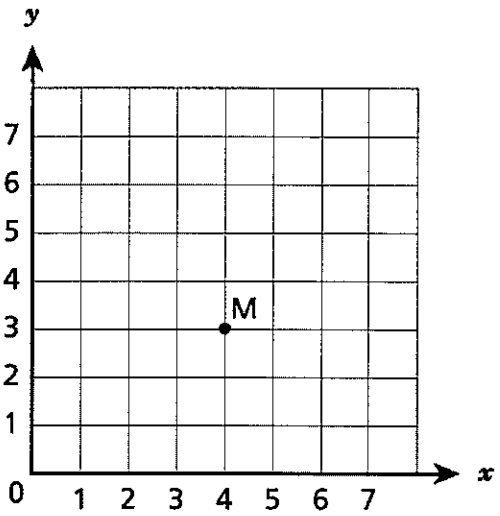
A



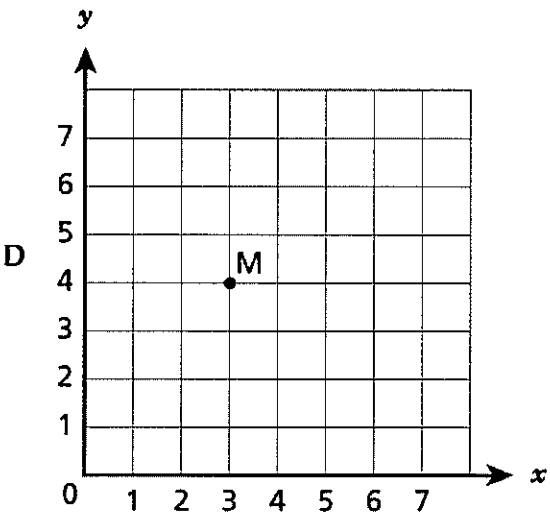

C




B




D




**GO ON**

51 A sandwich shop sells sandwiches for $5.95 each, including tax. The shop received a total of $71.40 from the sales of sandwiches one afternoon. Which equation can be used to determine the number of sandwiches, $x$, sold by the sandwich shop that afternoon?

A $5.95 + x = 71.40$

B $5.95 \div 71.40 = x$

C $5.95x = 71.40$

D $5.95 \div x = 71.40$

**STOP**

Name: _____

# New York State Testing Program

# 2017 Common Core Mathematics Test Book 3

# Grade 6

## May 2–4, 2017

Released Questions

# Grade 6 Mathematics Reference Sheet

## *CONVERSIONS*

1 inch = 2.54 centimeters
1 meter = 39.37 inches
1 mile = 5,280 feet
1 mile = 1,760 yards
1 mile = 1.609 kilometers

1 kilometer = 0.62 mile
1 pound = 16 ounces
1 pound = 0.454 kilogram
1 kilogram = 2.2 pounds
1 ton = 2,000 pounds

1 cup = 8 fluid ounces
1 pint = 2 cups
1 quart = 2 pints
1 gallon = 4 quarts
1 gallon = 3.785 liters
1 liter = 0.264 gallon
1 liter = 1,000 cubic centimeters

## *FORMULAS*

| | |
|---|---|
| **Triangle** | $A = \frac{1}{2}bh$ |
| **Right Rectangular Prism** | $V = Bh$ or $V = lwh$ |

# Book 3

## TIPS FOR TAKING THE TEST

Here are some suggestions to help you do your best:

- Read each question carefully and think about the answer before writing your response.
- You have been provided with mathematics tools (a ruler, a protractor, and a calculator) and a reference sheet to use during the test. It is up to you to decide when each tool and the reference sheet will be helpful. You should use mathematics tools and the reference sheet whenever you think they will help you to answer the question.
- Be sure to show your work when asked.

**53** The formula below is used to convert a temperature in degrees Celsius, $C$, to a temperature in degrees Fahrenheit, $F$.

$$F = 1.8C + 32$$

The high temperature in a mountain city was 15°C. What was the high temperature in degrees Fahrenheit?

***Show your work.***

*Answer* _____ °F

**55** It is recommended that one fire extinguisher be available for every 6,000 square feet in a building. Write and solve an equation to determine $x$, the number of fire extinguishers needed for a building that has 135,000 square feet.

*Show your work.*

*Answer* _____ fire extinguishers

**57** The area of Brian's rectangular garden, in square feet, can be found by using the expression $6(2x + 5y)$. Use the distributive property to write an equivalent expression for the area of Brian's garden.

***Equivalent expression*** _____

Use your equivalent expression to find the area of Brian's garden, in square feet, if $x = 3$ and $y = 4$.

***Show your work.***

***Area*** _____ square feet

**59** Jimmy and his family are on their way to visit some family friends who live 780 miles away from them. Based on the route they chose, they expect to complete their trip in three days. The distances and average speeds for the first two days driven are shown below.

- First day: 4 hours at an average speed of 60 miles per hour
- Second day: 6 hours at an average speed of 65 miles per hour

If the average speed on the third day is 60 miles per hour, how many more hours will it take for them to reach their family friends' home?

***Show your work.***

*Answer* _____ hours

**61** The table below shows the elevations at which different artifacts were found during an archeological dig.

| Artifact | Elevation |
|---|---|
| arrow head | 15 feet above sea level |
| bone | 721 feet above sea level |
| clay bowl | sea level |
| necklace | 462 feet above sea level |
| woven basket | 1,200 feet below sea level |

Write the name of each artifact and the elevation at which each artifact was found using a positive integer, zero, or negative integer.

Explain how you determined if an elevation required a positive integer, zero, or negative integer.

**STOP**

**THE STATE EDUCATION DEPARTMENT**
**THE UNIVERSITY OF THE STATE OF NEW YORK / ALBANY, NY 12234**
**2017 Mathematics Tests Map to the Standards**
**Released Questions on EngageNY**

Grade 6

| Question | Type | Key | Points | Standard | Cluster | Secondary Standard(s) | Multiple Choice Questions: Percentage of Students Who Answered Correctly (P-Value) | Constructed Response Questions: Average Points Earned | Constructed Response Questions: P-Value (Average Points Earned ÷ Total Possible Points) |
|---|---|---|---|---|---|---|---|---|---|
| **Book 1** | | | | | | | | | |
| 1 | Multiple Choice | B | 1 | CCSS.Math.Content.6.RP.A.3a | Ratios and Proportional Relationships | | 0.56 | | |
| 2 | Multiple Choice | D | 1 | CCSS.Math.Content.6.EE.B.5 | Expressions and Equations | | 0.57 | | |
| 3 | Multiple Choice | A | 1 | CCSS.Math.Content.6.NS.A.1 | The Number System | | 0.35 | | |
| 4 | Multiple Choice | C | 1 | CCSS.Math.Content.6.EE.A.1 | Expressions and Equations | | 0.69 | | |
| 9 | Multiple Choice | A | 1 | CCSS.Math.Content.6.G.A.1 | Geometry | | 0.24 | | |
| 10 | Multiple Choice | C | 1 | CCSS.Math.Content.5.G.A.2 | The Number System | | 0.38 | | |
| 13 | Multiple Choice | B | 1 | CCSS.Math.Content.6.EE.C.9 | Expressions and Equations | | 0.73 | | |
| 14 | Multiple Choice | C | 1 | CCSS.Math.Content.6.RP.A.3a | Ratios and Proportional Relationships | | 0.65 | | |
| 15 | Multiple Choice | A | 1 | CCSS.Math.Content.6.EE.A.2a | Expressions and Equations | | 0.65 | | |
| 16 | Multiple Choice | A | 1 | CCSS.Math.Content.6.EE.B.8 | Expressions and Equations | | 0.46 | | |
| 17 | Multiple Choice | C | 1 | CCSS.Math.Content.6.G.A.4 | Geometry | | 0.22 | | |
| 18 | Multiple Choice | A | 1 | CCSS.Math.Content.6.RP.A.3c | Ratios and Proportional Relationships | | 0.53 | | |
| 19 | Multiple Choice | A | 1 | CCSS.Math.Content.6.EE.B.6 | Expressions and Equations | | 0.42 | | |
| 20 | Multiple Choice | B | 1 | CCSS.Math.Content.6.NS.A.1 | The Number System | | 0.42 | | |
| 23 | Multiple Choice | D | 1 | CCSS.Math.Content.6.EE.A.3 | Expressions and Equations | | 0.64 | | |
| 24 | Multiple Choice | D | 1 | CCSS.Math.Content.6.RP.A.3c | Ratios and Proportional Relationships | | 0.49 | | |
| 25 | Multiple Choice | D | 1 | CCSS.Math.Content.6.EE.A.4 | Expressions and Equations | | 0.41 | | |
| 26 | Multiple Choice | C | 1 | CCSS.Math.Content.6.NS.B.4 | The Number System | | 0.52 | | |
| **Book 2** | | | | | | | | | |
| 27 | Multiple Choice | D | 1 | CCSS.Math.Content.6.RP.A.3c | Ratios and Proportional Relationships | | 0.78 | | |

Grade 6

**Released Questions on EngageNY**

| Question | Type | Key | Points | Standard | Cluster | Secondary Standard(s) | Multiple Choice Questions: Percentage of Students Who Answered Correctly (P-Value) | Constructed Response Questions: Average Points Earned | Constructed Response Questions: P-Value (Average Points Earned ÷ Total Possible Points) |
|---|---|---|---|---|---|---|---|---|---|
| 55 | Constructed Response | | 2 | CCSS.Math.Content.6.EE.B.7 | Expressions and Equations | | | 1.13 | 0.56 |
| 56 | Constructed Response | | 2 | CCSS.Math.Content.6.RP.A.3c | Ratios and Proportional Relationships | | | 0.70 | 0.35 |
| 57 | Constructed Response | | 2 | CCSS.Math.Content.6.EE.A.3 | Expressions and Equations | CCSS.Math.Content.6.EE.A.2c | | 1.07 | 0.54 |
| 58 | Constructed Response | | 3 | CCSS.Math.Content.6.EE.B.7 | Expressions and Equations | | | 2.07 | 0.69 |
| 59 | Constructed Response | | 3 | CCSS.Math.Content.6.RP.A.3b | Ratios and Proportional Relationships | | | 1.16 | 0.39 |
| 60 | Constructed Response | | 3 | CCSS.Math.Content.6.G.A.2 | Geometry | | | 0.76 | 0.25 |
| 61 | Constructed Response | | 3 | CCSS.Math.Content.6.NS.C.5 | The Number System | | | 1.96 | 0.65 |

*This item map is intended to identify the primary analytic skills necessary to successfully answer each question. However, some questions measure proficiencies described in multiple standards, including a balanced combination of procedural and conceptual understanding.

engage^ny

Our Students. Their Moment.

# New York State Testing Program
# Grade 6
# Mathematics Test

## Released Questions

## June 2018

New York State administered the Mathematics Tests in May 2018 and is now making approximately 75% of the questions from these tests available for review and use.

The scoring rubric for short and extended constructed-response questions can be found in the grade-level Educator Guides at https://www.engageny.org/resource/test-guides-english-language-arts-and-mathematics.

**New York State P-12 Learning Standards Alignment**

The alignment(s) to the New York State P-12 Learning Standards for Mathematics is/are intended to identify the primary analytic skills necessary to successfully answer each question. However, some questions measure proficiencies described in multiple standards, including a balanced combination of procedure and conceptual understanding. For example, two-point and three-point constructed-response questions require students to show an understanding of mathematical procedures, concepts, and applications.

***These Released Questions Do Not Comprise a "Mini Test"***

To ensure future valid and reliable tests, some content must remain secure for possible use on future exams. As such, this document is *not* intended to be representative of the entire test, to show how operational tests look, or to provide information about how teachers should administer the test; rather, its purpose is to provide an overview of how the test reflects the demands of the New York State P-12 Learning Standards.

The released questions do not represent the full spectrum of the standards assessed on the State tests, nor do they represent the full spectrum of how the standards should be taught and assessed in the classroom. It should not be assumed that a particular standard will be measured by an identical question in future assessments. Specific criteria for writing test questions, as well as additional assessment information, are available at http://www.engageny.org/common-core-assessments.

# Session 1

## TIPS FOR TAKING THE TEST

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**4** The relationship between Robert's age, $r$, and Julia's age, $j$, can be represented by the equation shown below.

$$r = j + 3$$

Which table of values represents the relationship between Robert's age and Julia's age?

A

**POSSIBLE AGES**

| Robert's Age, $r$ (years) | Julia's Age, $j$ (years) |
|---|---|
| 9 | 12 |
| 15 | 18 |
| 21 | 24 |

C

**POSSIBLE AGES**

| Robert's Age, $r$ (years) | Julia's Age, $j$ (years) |
|---|---|
| 9 | 6 |
| 15 | 12 |
| 21 | 18 |

B

**POSSIBLE AGES**

| Robert's Age, $r$ (years) | Julia's Age, $j$ (years) |
|---|---|
| 9 | 3 |
| 15 | 5 |
| 21 | 7 |

D

**POSSIBLE AGES**

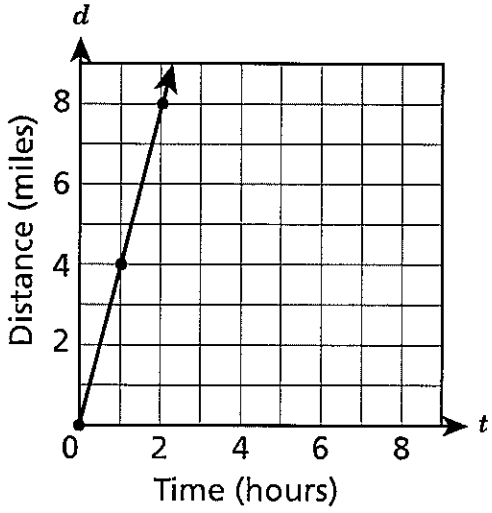
| Robert's Age, $r$ (years) | Julia's Age, $j$ (years) |
|---|---|
| 9 | 27 |
| 15 | 45 |
| 21 | 63 |

**16** Joe walks on a treadmill at a constant rate. The equation below describes the relationship between $t$, the time he walks in hours, and $d$, the distance he walks in miles.

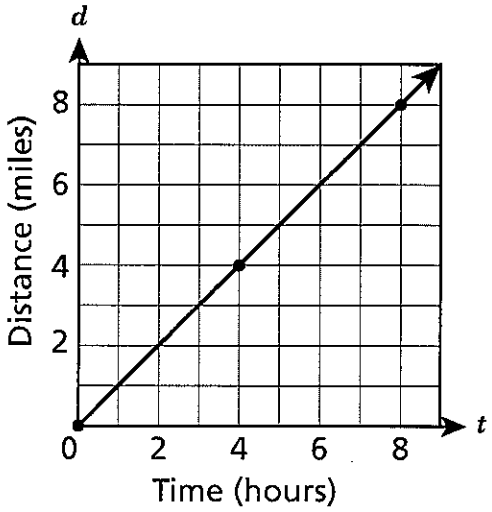
$$d = 4t$$

Which graph represents the relationship between the amount of time Joe walks and the distance he walks?

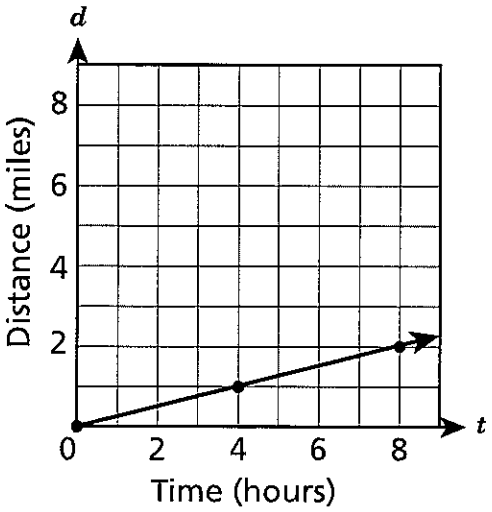
A



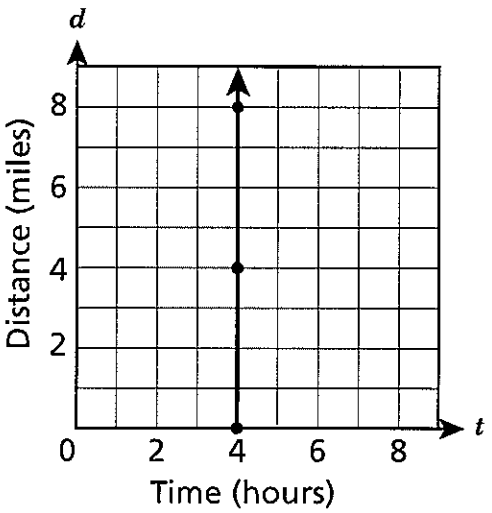

C




B




D



**22** A shape is made of 12 right triangles of equal size. Each right triangle has a base of 4 cm and a height of 5 cm. What is the total area, in square centimeters, of the shape?

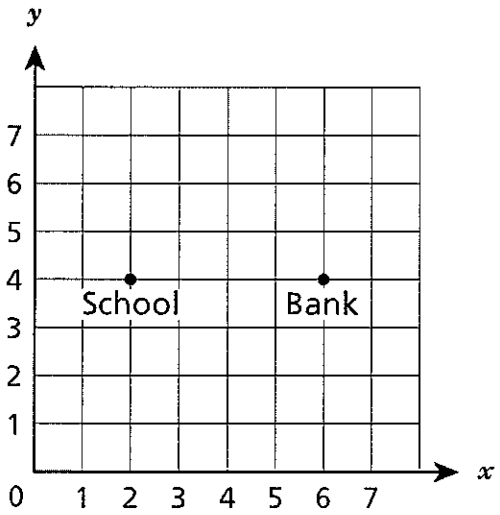
A 10

B 60

C 120

D 240

**27** Mark graphed points on the coordinate plane below to represent the locations of his school and a bank.




Mark wants to add the location of the library on the coordinate plane. The distance from the library to the school is the same as the distance from the bank to the school. Which ordered pair could be the coordinates of the library?

**A** $(2, 4)$

**B** $(2, 8)$

**C** $(4, 4)$

**D** $(6, 8)$

**GO ON**

**30** A machine fills boxes at a constant rate. At the end of 35 minutes, it has filled 5 boxes. Which table represents the relationship between the number of minutes the machine fills boxes and the number of boxes it has filled?

A

**FILLING BOXES**

| Time (minutes) | Boxes Filled |
|---|---|
| 7 | 1 |
| 14 | 2 |
| 21 | 3 |
| 28 | 4 |

C

**FILLING BOXES**

| Time (minutes) | Boxes Filled |
|---|---|
| 1 | 7 |
| 2 | 14 |
| 3 | 21 |
| 4 | 28 |

B

**FILLING BOXES**

| Time (minutes) | Boxes Filled |
|---|---|
| 5 | 1 |
| 10 | 2 |
| 15 | 3 |
| 20 | 4 |

D

**FILLING BOXES**

| Time (minutes) | Boxes Filled |
|---|---|
| 1 | 5 |
| 2 | 10 |
| 3 | 15 |
| 4 | 20 |

***GO ON***

# Grade 6
## 2018
## Mathematics Test
## Session 1
May 1–3, 2018

# Session 2

## TIPS FOR TAKING THE TEST

Here are some suggestions to help you do your best:

- Read each question carefully and think about the answer before making your choice or writing your response.
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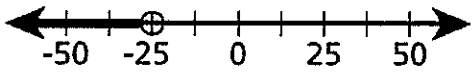
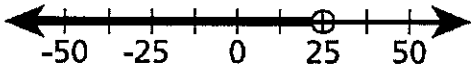
- Be sure to show your work when asked.

**34** Which number line shows a graph of the inequality $x > -25$?

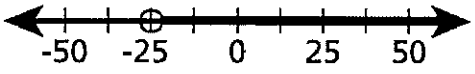
A



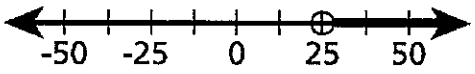

C




B




D




**35** The coordinates of the points below represent the vertices of a rectangle.

P : (2, 2)
Q : (6, 2)
R : (6, 5)
S : (2, 5)

What is the perimeter, in units, of rectangle PQRS?

A 8

B 12

C 14

D 16

**39** An art teacher has a total of $\frac{7}{8}$ pound of clay. The teacher puts $\frac{1}{16}$ pound of clay at each work station. The teacher sets up an equal number of work stations in each of 2 classrooms. How many work stations does the teacher set up in each of the classrooms?

***Show your work.***

***Answer*** _____ work stations

**41** A factory adds three red drops and two blue drops of coloring to white paint to make each pint of purple paint. The factory will make 50 gallons of this purple paint. How many drops of red and blue coloring will the factory need in the 50-gallon batch of purple paint?

***Show your work.***

***Answer*** _____ red drops; _____ blue drops

**43** Point W is located at $(-2, 3)$ on a coordinate plane. Point W is reflected over the *x*-axis to create point $W'$. Point $W'$ is then reflected over the *y*-axis to create point $W''$. What ordered pair describes the location of point $W''$?

*Answer* Point $W''$ (_____, _____)

***Explain how you determined your answer.***

**45** Cube-shaped blocks are packed into a cube-shaped storage container.

- The edge length of the storage container is $2\frac{1}{2}$ feet.
- The edge length of each block is $\frac{1}{5}$ the edge length of the storage container.

What is the volume, in cubic feet, of one cube-shaped block?

***Show your work.***

*Answer* _____ cubic feet

# Grade 6
## 2018
## Mathematics Test
## Session 2
May 1–3, 2018

| Question | Type | Points | Standard | Cluster | Multiple Choice Questions: Percentage of Students Who Answered Correctly (P-Value) | Constructed Response Questions: Average Points Earned | Constructed Response Questions: P-Value (Average Points Earned ÷ Total Possible Points) |
|---|---|---|---|---|---|---|---|
| Session 2 | | | | | | | |
| 32 | Multiple Choice | 1 | CCSS.Math.Content.6.NS.C.5 | The Number System | 0.82 | | |
| 33 | Multiple Choice | 1 | CCSS.Math.Content.6.RP.A.1 | Ratios and Proportional Relationships | 0.73 | | |
| 34 | Multiple Choice | 1 | CCSS.Math.Content.6.EE.B.8 | Expressions and Equations | 0.68 | | |
| 35 | Multiple Choice | 1 | CCSS.Math.Content.6.G.A.3 | Geometry | 0.48 | | |
| 36 | Multiple Choice | 1 | CCSS.Math.Content.6.NS.A.1 | The Number System | 0.61 | | |
| 37 | Multiple Choice | 1 | CCSS.Math.Content.6.EE.A.3 | Expressions and Equations | 0.28 | | |
| 38 | Multiple Choice | 1 | CCSS.Math.Content.6.RP.A.2 | Ratios and Proportional Relationships | 0.80 | | |
| 39 | Constructed Response | 2 | CCSS.Math.Content.6.NS.A.1 | The Number System | | 1.08 | 0.54 |
| 40 | Constructed Response | 2 | CCSS.Math.Content.6.EE.A.2a | Expressions and Equations | | 0.76 | 0.38 |
| 41 | Constructed Response | 2 | CCSS.Math.Content.6.RP.A.3d | Ratios and Proportional Relationships | | 0.6 | 0.30 |
| 42 | Constructed Response | 2 | CCSS.Math.Content.6.EE.A.1 | Expressions and Equations | | 0.5 | 0.25 |
| 43 | Constructed Response | 2 | CCSS.Math.Content.6.NS.C.6b | The Number System | | 0.7 | 0.35 |
| 44 | Constructed Response | 2 | CCSS.Math.Content.6.RP.A.2 | Ratios and Proportional Relationships | | 0.6 | 0.30 |
| 45 | Constructed Response | 2 | CCSS.Math.Content.6.G.A.2 | Geometry | | 0.44 | 0.22 |
| 46 | Constructed Response | 3 | CCSS.Math.Content.6.EE.B.7 | Expressions and Equations | | 0.63 | 0.21 |

*This item map is intended to identify the primary analytic skills necessary to successfully answer each question. However, some questions measure proficiencies described in multiple standards, including a balanced combination of procedural and conceptual understanding.