

5-2 day 2

WORD PROBLEMS: SOLVING SYSTEMS BY SUBSTITUTION

<http://www.phschool.com/webcodes10/index.cfm?fuseaction=home.gotoWebCode&wcprefix=ate&wcsuffix=07>

02 VIDEO



PLAY

[Solving linear systems for real-world situations using substitution](#)Using Systems

The substitution Method:

- Solve for a variable in one of the equations.
- Substitute the expression from step 1 into the other equation.
- Solve the resulting one-variable equation.
- Substitute the value from step 3 into the equation from step 1 and solve.

*** Check your work .**

Example: Suppose you buy 2 CD's and 8 DVD's for \$155. The next week you buy 1 CD and 5 DVD's for \$94.50. How much does each DVD and each CD cost?

Let c = _____ Let d = _____

WATCH THE VIDEO, FILL IN THE NOTES ON THIS PAGE.

check $c = 9.5$ and $d = 17$
in $2c + 8d = 155$
 $2(9.5) + 8(17) = 155$
 $19 + 136 = 155$
13 $155 = 155 \checkmark$



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1. Suppose your community center sells a total of 292 tickets for a basketball game. An adult ticket costs \$3. A student ticket costs \$1. The sponsors collect \$470 in ticket sales. Write and solve a system to find the number of each type of tickets sold. **203 student and 89 adult tickets.**

Let a = adult ticket Let s = student ticket

$$\begin{array}{r}
 a + s = 292 \rightarrow \\
 3a + 1s = 470 \\
 \hline
 3(292 - s) + 1s = 470 \\
 876 - 3s + 1s = 470 \\
 876 - 2s = 470 \\
 -876 \quad -876 \\
 \hline
 -2s = -406 \\
 \frac{-2}{-2} \quad \frac{-406}{-2} \\
 \hline
 s = 203
 \end{array}$$

find a :
 $a = 292 - 203$

$a = 89$

check in
 $3a + s = 470$
 $3(89) + 203 = 470$
 $470 = 470 \checkmark$

2. Pam is playing with red and black marbles. The number of red marbles she has is three more than twice the number of black marbles she has. She has 42 marbles in all. How many red marbles does Pam have?

Let r = red marbles Let b = black marbles

$$\begin{array}{r}
 r + b = 42 \\
 r = 2b + 3 \\
 \hline
 2b + 3 + b = 42 \\
 3b + 3 = 42 \\
 \downarrow -3 \quad -3 \\
 \hline
 3b = 39 \\
 \frac{3b}{3} = \frac{39}{3} \\
 \hline
 b = 13
 \end{array}$$

find r :
 $r = 2b + 3$
 $r = 2(13) + 3$
 $r = 26 + 3$
 $r = 29$

check:
 $r + b = 42$
 $29 + 13 = 42$
 $42 = 42 \checkmark$

Pam has 29 red marbles.

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3. Michael is 25 years younger than his father. The sum of their ages is 53. What is Michael's age?

Let $m =$ Michael's age Let $f =$ father's age

$$m = f - 25$$

$$m + f = 53$$

$$f - 25 + f = 53$$

$$2f - 25 = 53$$

$$\begin{array}{r} \downarrow +25 \quad | \quad +25 \\ \hline 2f \quad \quad = 78 \\ \hline \frac{2f}{2} \quad \quad = \frac{78}{2} \\ f = 39 \end{array}$$

find m :

$$m = f - 25$$

$$m = 39 - 25$$

$$m = 14$$

Michael is 14.

check in

$$m + f = 53$$

$$14 + 39 = 53$$

$$53 = 53 \checkmark$$

4. The total score in a football game was 72 points. The winning team scored 12 points more than the losing team. How many points did the winning team score?

Let $w =$ winners Let $l =$ losers

$$w + l = 72$$

$$w = 12 + l$$

$$12 + l + l = 72$$

$$12 + 2l = 72$$

$$\begin{array}{r} -12 \quad \downarrow \quad | \quad -12 \\ \hline 2l = 60 \\ \hline \frac{2l}{2} = \frac{60}{2} \\ l = 30 \end{array}$$

find w :

$$w + l = 72$$

$$w + 30 = 72$$

$$\begin{array}{r} -30 \quad -30 \\ \hline w = 42 \end{array}$$

The winners scored 42, the losers scored 30.

check in

$$w = 12 + l$$

$$42 = 12 + 30$$

$$42 = 42 \checkmark$$