

# Unit 6: Algebraic Models

## Using Formulas to Solve Problems

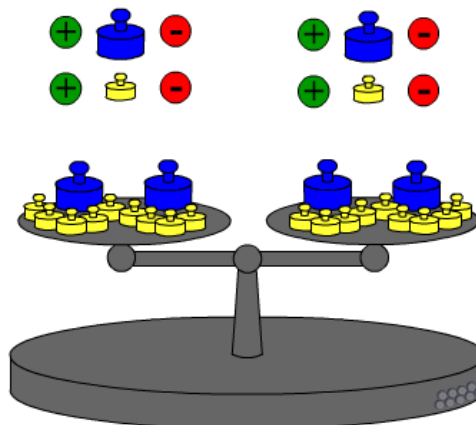
### Learning Goals

- review solving equations
- review how formulas can be used

Nov 24-4:39 PM

**Solving equations** - find the value of the variable

Scale



**Whatever you do to one side you must do to the other side.**

Jan 28-10:41 AM

Solve the following using the 'balance method' showing all your steps!!

1.  $x+3=9$   
 $x+3-3=9-3$   
 $x=6$

2.  $x-5=2$   
 $x-5+5=2+5$   
 $x=7$

3.  $6x=18$   
 $\frac{6x}{6}=\frac{18}{6}$   
 $x=3$

4.  $\frac{x}{-5}=4$   
 $\frac{x}{-5}(-5)=4(-5)$   
 $x=-20$

5.  $x-4=-3$   
 $x-4+4=-3+4$   
 $x=1$

6.  $\frac{x}{4}=1$   
 $\frac{x}{4}(4)=1(4)$   
 $x=4$

7.  $-3x+5=14+2x$   
 $-3x+5-2x=14+2x-2x$   
 $-5x+5=14$   
 $-5x+5-5=14-5$   
 $-5x=9$   
 $\frac{-5x}{-5}=\frac{9}{-5}$   
 $x=-\frac{9}{5}$

8.  $8+4x=-8+2x$   
 $8+4x-2x=-8+2x-2x$   
 $8+2x=-8$   
 $8-8+2x=-8-8$   
 $2x=-16$   
 $x=-8$

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MAP4C

Name: \_\_\_\_\_

9.  $\frac{1}{3}x = -8$   
 $\frac{1}{3}x = -8 - 4$   
 $\frac{1}{3}x = -12$   
 $\frac{1}{3}x(3) = -12(3)$   
 $x = -36$

10.  $\frac{2}{3}x = 12$   
 $\frac{2}{3}x(3) = 12(3)$   
 $2x = 36$   
 $x = 18$

11.  $0.4x + 12.8 = 10$   
 $x = -36$   
 $0.4x = 10 - 12.8$   
 $0.4x = -2.8$   
 $x = -7$

12.  $8 - 8x = 2$   
 $-8x = 2 - 8$   
 $-8x = -6$   
 $x = \frac{-6}{-8}$   
 $x = \frac{3}{4}$

Nov 9-11:01 AM

## 6.1 Using Formulas to Solve Problems

- Formulas usually have more than one variable.
- Substitution is used to evaluate the formula for the desired variable.
- The steps to solve a formula are the same as the steps to solve a linear equation.

1. Given  $P = 2(l + w)$  Solve for P when  $w = 100\text{ cm}$   $l = 75\text{ cm}$

$$\begin{aligned} P &= 2(75 + 100) \\ &= 2(175) \\ &= 350 \end{aligned} \quad \therefore 350\text{ cm}$$

2. Given  $A = \frac{h(a+b)}{2}$ , solve for A when  $a = 7\text{ mm}$   $b = 4\text{ mm}$   $h = 2\text{ mm}$

$$\begin{aligned} A &= \frac{2(7+4)}{2} \\ &= \frac{2(11)}{2} \\ &= 11 \end{aligned} \quad \therefore A = 11\text{ mm}^2$$

Nov 24-6:28 PM

Sasha makes and sells T-shirts. The cost, C dollars, to produce n T-shirts is given by  $C = 300 + 7n$ .

The revenue, R dollars, earned when n T-shirts are sold is given by

$$R = n\left(15 - \frac{n}{200}\right)$$

- Determine the cost of making 200 T-shirts.
- Profit is the difference between revenue and cost. Determine the profit from making and selling 1000 shirts.

$$\begin{aligned} \text{a.) } C &= 300 + 7n \\ &= 300 + 7(200) \\ &= 300 + 1400 \\ &= 1700 \end{aligned} \quad \therefore C \text{ is } \$1700.00$$

$$\begin{aligned} \text{b.) } P &= R - C \\ &= n\left(15 - \frac{n}{200}\right) - (300 + 7n) \\ &= 1000\left(15 - \frac{1000}{200}\right) - (300 + 7(1000)) \\ &= 1000(10) - (300 + 7000) \\ &= 10000 - 7300 \\ &= 2700 \end{aligned} \quad \therefore P \text{ is } \$2700.00$$

Nov 13-10:48 AM

## Seatwork

pg 346 # 1-4 a and b only  
# 7, 9, 14

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