Determine each unknown.

w + 7 = -9

$$w + 7 - 7 = -9 - 7$$
$$w = -16$$

18 - q = 31

$$18 - q - 18 = 31 - 18$$
$$-q = 13$$
$$\frac{-q}{-1} = \frac{13}{-1}$$
$$q = -13$$

-4h = -48

$$\frac{-4h}{-4} = \frac{-48}{-4}$$
$$h = 12$$

96 = -48
k

$$\frac{96}{k} \times k = -48 \times k$$
$$96 = -48k$$
$$\frac{96}{-48} = \frac{-48k}{-48}$$
$$-2 = k$$

MTH1W Grade 9 Mathematics

3.5 Solving Two-Step Equations

Goal(s)   *- To successfully determine and apply the operations in the proper order to both sides of the equation to isolate a variable*

Page 134 #s 1, 2, 4, 6, 7, 10, 14, 15

To solve an equation involving multiple terms, collect variable terms on one side of the equation and constant terms on the other.

$$4x + 7$$

variable term   constant term
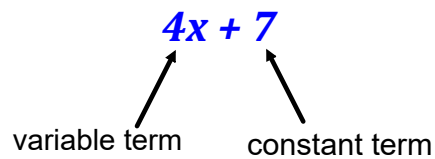
Use **opposite operations** to collect terms on either side of the equation.

Whenever possible, try to keep the coefficient of the variable term positive.

$$3x - 4 = 9 + 2x$$
$$3x - 4 - 2x = 9 + 2x - 2x$$
$$x - 4 = 9$$
$$x - 4 + 4 = 9 + 4$$
$$x = 13$$

Isolate the variable terms on the side of the equation where its coefficient will remain positive.

Isolate the constant terms on the other side of the equation.

Find the root (solution) of the equation.

$$4y - 6 = 2y + 4$$

$$4y - 6 - 2y = 2y + 4 - 2y$$

$$2y - 6 = 4$$

$$2y - 6 + 6 = 4 + 6$$

$$\frac{2y}{2} = \frac{10}{2}$$

$$y = 5$$

CHECK

$$LS = RS$$
$$4(5) - 6 = 2(5) + 4$$
$$20 - 6 = 10 + 4$$
$$14 = 14 \checkmark$$

2

Find the root (solution) of the equation.

$$13 + 5m = -8 + 3m$$

$$13 + 5m - 3m = -8 + 3m - 3m$$

$$13 + 2m = -8$$

$$13 + 2m - 13 = -8 - 13$$

$$\frac{2m}{2} = \frac{-21}{2}$$

$$m = -10.5$$

CHECK

$$LS = RS$$

$$13 + 5(-10.5)$$
$$= -8 + 3(-10.5)$$

$$13 - 52.5 = -8 - 31.5$$

$$-39.5 = -39.5 \checkmark$$

Find the root (solution) of the equation.

$$6w + 7 - 4w = 13 - 3w - 5$$

$$2w + 7 = 8 - 3w$$

$$2w + 7 + 3w = 8 - 3w + 3w$$

$$5w + 7 = 8$$

$$5w + 7 - 7 = 8 - 7$$

$$\frac{5w}{5} = \frac{1}{5}$$

$$w = 0.2$$

3

If *2a + 7 = 21* and *3b - 4 = 8*, determine *5a + 4b*.

$$2a + 7 = 21$$
$$2a + 7 - 7 = 21 - 7$$
$$\frac{2a}{2} = \frac{14}{2}$$
$$a = 7$$

$$3b - 4 = 8$$
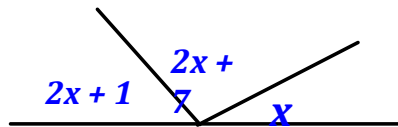$$3b - 4 + 4 = 8 + 4$$
$$\frac{3b}{3} = \frac{12}{3}$$
$$b = 4$$

$$\Rightarrow 5a - 4b$$
$$= 5(7) - 4(4)$$
$$= 35 - 12$$
$$= 23$$

Determine the measure of each angle to the nearest tenth of a degree.

2x + 7
2x + 1
x

The 3 angles will total 180
(angles on a straight line)

$$2x + 1 + 2x + 7 + x = 180$$
$$5x + 8 = 180$$
$$5x + 8 - 8 = 180 - 8$$
$$\frac{5x}{5} = \frac{172}{5} \Rightarrow x = 34.4$$

Angles are ...

$x = 34.4°$

$2x + 7$
$= 2(34.4) + 7$
$= 75.8°$

$2x + 1$
$= 2(34.4) + 1$
$= 69.8°$

4