Name: _____ Date: _____

Lesson 3.4 Solving for a Variable in a Two-Variable Linear Equation

Solve for a variable in a linear equation with parentheses.

Example

The formula for converting a length f, in feet, to a length h, in inches, is $f = 12h$.

a) Express h in terms of f.

$f = 12h$

$\frac{f}{12} = \frac{12h}{12}$ Divide both sides by 12.

$h = \frac{f}{12}$ Simplify.

b) Create a table of f and h values for $f = 2, 4, 6$, and 8.

Substitute $f = 2, 4, 6$, and 8 into the equation $h = \frac{f}{12}$:

$h = \frac{2}{12}$ $h = \frac{4}{12}$ $h = \frac{6}{12}$ $h = \frac{8}{12}$

$= \frac{1}{6}$ $= \frac{1}{3}$ $= \frac{1}{2}$ $= \frac{2}{3}$

So, the table of values is:

***f* (feet)**	2	4	6	8
***h* (inch)**	$\frac{1}{6}$	$\frac{1}{3}$	$\frac{1}{2}$	$\frac{2}{3}$

Name: _____ Date: _____

Complete.

1. Solve for b in terms of a in the equation $3(a - 2) = 4b + 5$. Find b when $a = 4$.

$\_\_\_\_\_ - \_\_\_\_\_ = 4b + 5$ Use the distributive property.

$\_\_\_\_\_ - \_\_\_\_\_ + \_\_\_\_\_ = 4b + 5 + \_\_\_\_\_$ Add _____ to both sides.

$\_\_\_\_\_ = \_\_\_\_\_ + \_\_\_\_\_$ Simplify.

$\_\_\_\_\_ - \_\_\_\_\_ = \_\_\_\_\_ + \_\_\_\_\_ - \_\_\_\_\_$ Subtract _____ from both sides.

$\dfrac{\square - \square}{\square} = \dfrac{\square}{\square}$ Simplify. Divide both sides by _____.

$b = \dfrac{\square - \square}{\square}$ Simplify.

Substitute $a = 4$ into the equation $b = \dfrac{\square - \square}{\square}$.

$b = \dfrac{\square(\square) - \square}{\square}$ Substitute $a = 4$.

$= \_\_\_\_\_$ Simplify.

Solve. Show your work.

2. Solve for p in terms of q in the equation $2q = \frac{1}{3}(5p - 9)$. Find p when $q = -2$.

Name: _____ Date: _____

Solve. Show your work.

3. Solve for k in terms of m in the equation $k - 3m = 10 - 2(m - 7)$.
Find k when $m = 8$.

Solve for a variable in a linear equation when parentheses are needed.

Example

A circular clock has a radius expressed as r. Its area is given by $A = \frac{22}{7}r^2$.

a) Solve this equation for r in terms of A.

$A = \frac{22}{7}r^2$

$A \cdot 7 = \frac{22r^2}{7} \cdot 7$ Multiply both sides by 7.

$\frac{7A}{22} = \frac{22r^2}{22}$ Divide both sides by 22.

$r^2 = \frac{7}{22}A$ Simplify.

$r = \sqrt{\frac{7}{22}A}$ Take the square root both sides.

b) Create a table of values for A and r when $A = 10$, 20, 30, and 40.
Round each r value to the nearest hundredth.

Substitute $A = 10$, 20, 30, and 40 into the equation $r = \sqrt{\frac{7}{22}A}$:

$r = \sqrt{\frac{7}{22} \cdot 10}$ $r = \sqrt{\frac{7}{22} \cdot 20}$ $r = \sqrt{\frac{7}{22} \cdot 30}$ $r = \sqrt{\frac{7}{22} \cdot 40}$

$= 1.78$ $= 2.52$ $= 3.09$ $= 3.57$

So, the table of values is:

A	10	20	30	40
r	1.78	2.52	3.09	3.57

Name: _____ Date: _____

Complete.

4. The mean temperature of the day is T. The mean temperature was calculated by finding the average of the following four temperatures taken at equal intervals throughout the day: x, 32, $x + 4$, and $x - 2$.

a) Express x in terms of T.

$T = \frac{x + 32 + (x + 4) + (x - 2)}{4}$ — Write an equation for T in terms of x.

_____ $\cdot T =$ _____ $\cdot \frac{x + 32 + (x + 4) + (x - 2)}{4}$ — Multiply both sides by _____.

_____ $= x + 32 +$ _____ $+$ _____ $+$ _____ $-$ _____ — Simplify. Use the distributive property.

_____ $=$ _____ $+$ _____ — Simplify.

_____ $-$ _____ $=$ _____ $+$ _____ $-$ _____ — Subtract _____ from both sides.

_____ $=$ _____ $-$ _____ — Simplify.

$\frac{\square}{\square} = \frac{\square - \square}{\square}$ — Divide both sides by _____.

$x = \frac{\square - \square}{\square}$ — Simplify.

b) Create a table of values for T and x when $T = 28$, 29, 30, and 31. Round each x value to the nearest tenth.

Substitute $T = 28$, 29, 30, and 31 into the equation $x = \frac{4T - 34}{3}$ and complete the table of values:

T	28	29	30	31
x				