

Handout 1.1: Solving Equations

Name: Key

Date: _____

Per: _____

Solve each equation. Check your solution.

1) $3y + 4 = 19$
 $-4 \quad -4$
 $\frac{3y}{3} = \frac{15}{3}$

$y = 5$

check:
 $3(5) + 4 \stackrel{?}{=} 19$
 $15 + 4 = 19 \checkmark$

2) $-9x - 8 = 55$
 $+8 \quad +8$
 $\frac{-9x}{-9} = \frac{63}{-9}$

$x = -7$

check:
 $-9(-7) - 8 \stackrel{?}{=} 55$
 $63 - 8 = 55 \checkmark$

3) $7y - 2y + 4 + 3y = -20$

$8y + 4 = -20$
 $-4 \quad -4$
 $\frac{8y}{8} = \frac{-24}{8}$

$y = -3$

check:
 $7(-3) - 2(-3) + 4 + 3(-3) \stackrel{?}{=} -20$
 $-21 + 6 + 4 - 9 \stackrel{?}{=} -20$
 $-15 - 5 = -20 \checkmark$

4) $5g + 18 - 7g + 4g = 8$

$2g + 18 = 8$
 $-18 \quad -18$
 $\frac{2g}{2} = \frac{-10}{2}$

$g = -5$

check:
 $5(-5) + 18 - 7(-5) + 4(-5) \stackrel{?}{=} 8$
 $-25 + 18 + 35 - 20 \stackrel{?}{=} 8$
 $-7 + 15 = 8 \checkmark$

5) $5(-2x - 4) - 3(4x + 5) = 97$

$-10x - 20 - 12x - 15 = 97$

$-22x - 35 = 97$
 $+35 \quad +35$
 $\frac{-22x}{-22} = \frac{132}{-22}$

$x = -6$

check
 $5(-2(-6) - 4) - 3(4(-6) + 5) \stackrel{?}{=} 97$
 $5(12 - 4) - 3(-24 + 5) \stackrel{?}{=} 97$
 $5(8) - 3(-19) \stackrel{?}{=} 97$
 $40 + 57 = 97 \checkmark$

6) $7(a + 1) - 3a = 5 + 4(2a - 1)$

$7a + 7 - 3a = 5 + 8a - 4$

$4a + 7 = 8a + 1$
 $-4a \quad -4a$

$7 = 4a + 1$
 $-1 \quad -1$
 $\frac{6}{4} = \frac{4a}{4}$

$a = \frac{6}{4} \div 2$

$a = \frac{3}{2}$

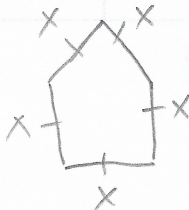
check:
 $7(\frac{3}{2} + 1) - 3(\frac{3}{2}) \stackrel{?}{=} 5 + 4(2(\frac{3}{2}) - 1)$
 $7(\frac{3}{2} + \frac{2}{2}) - \frac{9}{2} \stackrel{?}{=} 5 + 4(3 - 1)$
 $7(\frac{5}{2}) - \frac{9}{2} \stackrel{?}{=} 5 + 4(2)$
 $\frac{35}{2} - \frac{9}{2} \stackrel{?}{=} 5 + 8$
 $\frac{26}{2} = 13 \checkmark$

7) **GEOMETRY** The perimeter of a regular pentagon is 100 inches. Find the length of each side.

Regular = All sides congruent

Pentagon = 5 sided polygon

Perimeter = Distance around
 (add up all side lengths!)



$x + x + x + x + x = 100$

$\frac{5x}{5} = \frac{100}{5}$

$x = 20 \text{ inches}$

- 8) **MEDICINE** For Nina's illness her doctor gives her a prescription for 28 pills. The doctor says that she should take 4 pills the first day and then 2 pills each day until her prescription runs out. For how many days does she take 2 pills?

$$\begin{aligned} \text{Start} \rightarrow 4 + 2x &= 28 \quad \leftarrow \text{total pills} \\ &\quad \quad \quad \leftarrow \text{2 per day} \\ &\quad \quad \quad -4 \\ \hline 2x &= 24 \\ \frac{2x}{2} &= \frac{24}{2} \\ \hline \boxed{x = 12 \text{ days}} \end{aligned}$$

Solve each equation or formula for the specified variable.

9) $E = mc^2$, for m

$$\boxed{m = \frac{E}{c^2}}$$

10) $c(a + b) - d = f$, for a

$$\begin{aligned} c(a+b) - d &= f \\ c(a+b) &= f + d \\ a+b &= \frac{f+d}{c} \\ a &= \frac{f+d}{c} - b \end{aligned}$$

11) $z = \pi q^3 h$, for h

$$\boxed{h = \frac{z}{\pi q^3}}$$

12) $\frac{x+y}{z} - a = b$, for y

$$\begin{aligned} \frac{x+y}{z} - a &= b \\ \frac{x+y}{z} &= (b+a)z \\ x+y &= z(b+a) \\ y &= z(b+a) - x \end{aligned}$$

13) $y = ax^2 + bx + c$, for a

$$y - c = ax^2 + bx$$

$$\frac{y - c - bx}{x^2} = \frac{ax^2}{x^2}$$

$$\boxed{a = \frac{y - c - bx}{x^2}}$$

14) $wx + yz = bc$, for z

$$\frac{yz}{y} = \frac{bc - wx}{y}$$

$$\boxed{z = \frac{bc - wx}{y}}$$

15) **SIMPLIFY** $3x + 8y + 5z - 2y - 6x + z$

$$\boxed{-3x + 6y + 6z}$$