UNIT 2: Solving Equations

1. Match each property with the equation that illustrates it. Write the name of the property in the next to the appropriate equation.

   List of properties:
   Associative property of addition
   Additive identity
   Associative property of multiplication
   Additive Inverse
   Commutative Property of Addition
   Commutative Property of Multiplication
   Multiplicative Identity
   Multiplicative Inverse
   Zero Property
   Distributive Property

   a. $x*1 = x$ __Multiplicative Identity__

   b. $m+n = n+m$ __Commutative Property__ of Addition

   c. $(q+r)+s = q+(r+s)$ __Associative Property__ of Addition

   d. $739+0 = 739$ __Additive ~~Inverse~~ Identity__

   e. $p+(-p) = 0$ __Additive Inverse__

   f. $1 = 1/x * x$ __Multiplicative Inverse__

   g. $3(y+6) = 3y+18$ __Distributive Property__

   h. $n*m = m*n$ ~~Associative~~ Commutative __Property__ of Multiplication

   i. $2*(7*7) = (2*7)*7$ ~~Commutative~~ Associative __Property__ of Multiplication

   j. $a*0 = 0$ __Zero Property__

2. Describe the difference between the Multiplicative Inverse Property and the Multiplicative Identity Property. The multiplicative inverse property always results in 1 whereas the multiplicative identity always results in the # you started with.

3. Describe the difference between the Additive Inverse and the Zero Property.
   The zero property says that any # multiplied by zero gives you zero.
   In case of Additive Inverse, a # plus its additive inverse also results in zero, but the path to zero is different from

KEY

Solving Equations Review 1

Date_____

Solve each equation.

1) $-63 = -9 - 6n$

$$\underline{+9 \quad +9}$$

$$-54 = -6n$$

$$\underline{-6 \quad -6}$$

$$\boxed{9 = n}$$

2) $-5 = \dfrac{3+m}{2}$

$$-10 = 3 + m$$

$$\boxed{-13 = m}$$

3) $3 = 4 + \dfrac{a}{14}$

$$\underline{-4 \quad -4}$$

$$-1 = \dfrac{a}{14}$$

$$\boxed{a = -14}$$

4) $-3(-3n - 4) = 48$

$$9n + 12 = 48$$

$$\underline{-12 \quad -12}$$

$$9n = 36$$

$$\boxed{n = 4}$$

5) $-3k + 4(1 - 4k) = 42$

$$-3k + 4 - 16k = 42$$

$$-19k + 4 = 42$$

$$\underline{-4 \quad -4}$$

$$-19k = 38$$

$$\boxed{k = -2}$$

6) $7(1 + p) - 5(p - 6) = p + 1 + 4p$

$$7 + 7p - 5p + 30 = p + 4p + 1$$

$$2p + 37 = 5p + 1$$

$$\underline{-2p \qquad -2p}$$

$$37 = 3p + 1$$

$$\underline{-1 \qquad -1}$$

$$36 = 3p \rightarrow \boxed{p = 12}$$

7) $-4(4 + 2k) = 4(k + 5)$

$$-16 - 8k = 4k + 20$$

$$\underline{+8k \quad +8k}$$

$$-16 = 12k + 20$$

$$\underline{-20 \qquad -20}$$

$$-36 = 12k \rightarrow \boxed{k = -3}$$

8) $\dfrac{10}{8} = \dfrac{4}{p}$

$$10p = 32$$

$$p = \dfrac{32}{10} = \boxed{\dfrac{16}{5}}$$

9) $\dfrac{5}{2} = \dfrac{k+2}{8}$

$$40 = 2(k + 2)$$

$$40 = 2k + 4$$

$$\underline{-4 \qquad -4}$$

$$\dfrac{36}{2} = \dfrac{2k}{2} \rightarrow \boxed{18 = k}$$

10) $-\dfrac{2}{n-9} = -\dfrac{3}{n}$

$$\dfrac{-2}{n-9} = \dfrac{-3}{n}$$

negatives in numerator

$$-2n = -3(n - 9)$$

$$-2n = -3n + 27$$

$$\underline{+3n \quad +3n} \rightarrow \boxed{n = 27}$$

KEY

1. Mr. Rodriguez spent $170 at the mall. He bought one pair of shoes for $80 and three nice shirts. If each shirt cost the same amount, how much did each shirt cost?

   a. Define your variable.

   c = how much each shirt cost

   b. Write an equation that describes this situation.

   $$170 = 80 + 3c$$

   a. Solve your equation and answer the question in a full sentence.

   $$170 = 80 + 3c$$
   $$-80 \quad -80$$
   $$\overline{\quad\quad\quad\quad\quad}$$
   $$90 = 3c$$
   $$\boxed{c = 30} \quad \boxed{\text{Each shirt costs } \$30.}$$

1. The sum of four consecutive integers is 42. What is the smallest integer?

   a. Write an equation that describes this situation? Be sure to define your variables!

   1st integer is x
   2nd integer is $x+1$
   3rd integer is $x+2$
   4th integer is $x+3$

   $$x + x+1 + x+2 + x+3 = 42$$

   b. Solve your equation and answer the question in a full sentence.

   $$4x + 6 = 42$$
   $$-6 \quad -6$$
   $$\overline{\quad\quad\quad\quad\quad}$$
   $$4x = 36$$
   $$\boxed{x = 9} \quad \boxed{\text{The smallest integer is } 9.}$$

3. The sum of two consecutive **ODD** integers is 48. What are the two integers?

   a. Write an equation that represents this situation- be sure to define your variables.

   $x = 1^{st}$ odd integer
   $x+2 = 2^{nd}$ odd integer

   $$x + x + 2 = 48$$

   b. Solve your equation and answer the question in a full sentence.

   $$x + x + 2 = 48$$
   $$-2 \quad\quad -2$$
   $$\overline{\quad\quad\quad\quad\quad}$$
   $$2x = 46$$
   $$\boxed{x = 23}$$

   $$\boxed{\text{The two integers are } 23 \text{ \& } 25.}$$

Unit 2: Solving Equations **KEY**

Name_____

Literal Equations Review

Date_____

1) Solve for p.

$\frac{1}{3}p = n \cdot 3$

$p = 3n$

2) Solve for y.

$xy - d = m$

$\frac{+d \quad +d}{xy = m+d}$

$x = m+d$

$xy - d = m$
$\frac{+d \quad +d}{}$
$\frac{xy}{x} = \frac{m+d}{x}$

$y = \frac{m+d}{x}$

3) Solve for d.

$xy - d = m$

$\frac{+d \quad +d}{xy = m+d}$

$\frac{-m \quad -m}{xy - m = d}$

4) Solve for w.

$V = lwh$

$\frac{}{lh} \cdot \frac{}{lh}$

$\frac{V}{lh} = w$

5) Solve for h.

$2 \cdot A = \frac{1}{2}bh \cdot 2$

$\frac{2A}{b} = \frac{bh}{b}$

$\frac{2A}{b} = h$

6) Solve for r.

$A = \pi r^2$

$\frac{}{\pi} \quad \frac{}{\pi}$

$\sqrt{\frac{A}{\pi}} = \sqrt{r^2} \longrightarrow r = \sqrt{\frac{A}{\pi}}$

7) Solve for b_1.

$A = \frac{1}{2}h(b_1 + b_2)$

$A = \frac{1}{2}hb_1 + \frac{1}{2}hb_2$

$-\frac{1}{2}hb_2 \qquad -\frac{1}{2}hb_2$

$2\left(A - \frac{1}{2}hb_2\right) = \frac{1}{2}hb_1 \cdot 2$

$2A - hb_2 = hb_1 \quad \div h \longrightarrow \frac{2A}{h} - b^2 = b_1$

8) Solve for l.

$P = 2l + 2w$

$\frac{-2w \qquad -2w}{P - 2w = 2l}$

$\frac{P - 2w}{2} = \frac{2l}{2} \longrightarrow l = \frac{P}{2} - w$

9) Solve for b.

$3 \cdot V = \frac{1}{3}b^2 \cdot h \cdot 3$

$\frac{3V}{bh} = \frac{b^2h}{bh}$

$\sqrt{\frac{3V}{h}} = \sqrt{b^2} \longrightarrow b = \sqrt{\frac{3V}{h}}$

10) Solve for x.

$y = mx + b$

$\frac{-b \qquad -b}{y - b = mx}$

$\frac{y-b}{m} = \frac{mx}{m}$

$\frac{y-b}{m} = x$

Modeling **2** Review   **KEY**   Answer Key

1. Dominique Ansel bakery sells truffles. Abby wants to buy 18 truffles. She can either buy one small heart-shaped package, one single truffle, and one large basket of 10 truffles or she can buy two small heart-shaped packages and 4 single truffles. How many truffles are in a small heart-shaped package?

    a. Define a variable to represent this situation.

    $t = \#$ of truffles in a small package

    b. Write an equation to represent this situation.

    $t + 1 + 10 = 18 \qquad 2t + 4 = 18$

    c. Solve your equation and write your answer in a full sentence.

    $t + 1 + 10 = 2t + 4 \cancel{18}$

    $t + 11 = 2t + 4$

    $\underline{-t \qquad -t}$

    $\underline{-4} = t + \underline{4}$

    $7 = t$

    There are 7 truffles in a small package.

2. At an amusement park, Teddy can go on three rides and have $16 left over or he can go on 6 rides and have $4 left over. Each ride costs the same amount of money.

    a. Write an equation to represent this situation. Remember to define your variable.

    $r = $ cost of one ride

    $3r + 16 = 6r + 4$

    b. Solve your equation to find out how much it costs to go on one ride.

    $3r + 16 = 6r + 4$

    $\underline{-3r \qquad -3r}$

    $16 = 3r + 4$

    $\underline{-4 \qquad -4}$

    $12 = 3r$

    $r = 4$

    It costs $4 for each ride.

    c. How much money does teddy have to spend at the park?

    $3(4) + 16 =$

    $12 + 16 = \boxed{28.}$

    He has $28 to spend at the park.

3. Ms. P. is thinking of a number. Two times the quantity of twice the number plus four is equal to that number minus four. What number is Ms. P thinking of?

    a. Write an equation to represent this situation.

    $n = $ number Ms. P is thinking of.

    $2(2n + 4) = n - 4$

    b. Solve your equation and write your answer in a full sentence.

    $2(2n + 4) = n - 4$

    $4n + 8 = n - 4$

    $\underline{-n \qquad -n}$

    $3n + 8 = -4$

    $\underline{-8 \qquad -8}$

    $3n = -12$

    $n = -4$

    Ms. P. is thinking of -4

KEY

Name **Answer Key**

Solving Equations Review 2

Date_____

Solve each equation.

1) $-15 + \dfrac{x}{36} = -14$

$+15 \qquad +15$

$(36)\dfrac{x}{36} = 1(36)$

$\boxed{x = 36}$

2) $\dfrac{r - 16}{-2} = 26 \ (-2)$

$r - 16 = -52$

$+16 \qquad +16$

$\boxed{r = -36}$

3) $p - \dfrac{3}{2} + \dfrac{4}{3}p = 2$

$p(3) + \dfrac{4p}{3} - \dfrac{3}{2} = 2$

$\dfrac{3p}{3} + \dfrac{4p}{3} - \dfrac{3}{2} = 2$

$\dfrac{7p}{3} - \dfrac{3}{2} = 2$

$\qquad +\dfrac{3}{2} \quad +\dfrac{3}{2}$

$\dfrac{7p}{3} = 2 + \dfrac{3}{2}$

$\dfrac{7p}{3} = \dfrac{4}{2} + \dfrac{3}{2}$

$\dfrac{7p}{3} = \dfrac{7}{2}\left(\dfrac{3}{7}\right)$

$\boxed{p = \dfrac{3}{2}}$

4) $-3\left(\dfrac{8}{3}a - \dfrac{3}{2}\right) = \dfrac{65}{2}$

$-3\left(\dfrac{8a}{3}\right) + 3\left(\dfrac{3}{2}\right) = \dfrac{65}{2}$

$-8a + \dfrac{9}{2} = \dfrac{65}{2}$

$\qquad -\dfrac{9}{2} \quad -\dfrac{9}{2}$

$-8a = \dfrac{56}{2}$

$\dfrac{-8a}{-8} = \dfrac{28}{-8}$

$\boxed{a = \dfrac{-7}{2}}$

5) $-\dfrac{3}{18} = \dfrac{5}{2}\left(\dfrac{1}{3}m - \dfrac{4}{3}\right)$

$\left(-\dfrac{3}{18}\right) = \left(\dfrac{5m}{6} - \dfrac{20}{6}\right)6$

$-\dfrac{18}{18} = 5m - 20$

$-1 = 5m - 20$

$+20 \qquad +20$

$\dfrac{19}{5} = \dfrac{5m}{5} \qquad \boxed{m = \dfrac{19}{5}}$

6) $\dfrac{x - 2}{9} = \dfrac{x - 6}{7}$

$7(x-2) = 9(x-6)$

$7x - 14 = 9x - 54$

$-7x \qquad -7x$

$-14 = 2x - 54$

$+54 \qquad +54$

$\dfrac{40}{2} = \dfrac{2x}{2}$

$\boxed{20 = x}$

7) $3(4x - 8) = -2(-6x + 1)$

$12x - 24 = 12x - 2$

$-12x \qquad -12x$

$-24 \neq -2$

$\boxed{\text{no solution}}$

8) $2\left(-\dfrac{4}{3}v + 1\right) + 2 = \dfrac{34}{3} + v$

$-\dfrac{8v}{3} + 2 + 2 = \dfrac{34}{3} + v$

$3\left(-\dfrac{8v}{3} + 4\right) = \left(\dfrac{34}{3} + v\right)3$

$-8v + 12 = 34 + 3v$

$+8v \qquad\qquad +8v$

$12 = 34 + 11v$

$-34 \quad -34$

$-22 = 11v$

$\dfrac{-22}{11} = \dfrac{11v}{11}$

$\boxed{-2 = v}$