

## Unit 1 Study Guide

Evaluate each expression.

$$1) (-6-1)^2$$

$$(-7)^2$$

$$\boxed{49}$$

$$2) \frac{12}{(6-1-2+1)} \rightarrow \frac{12}{(5-2+1)} \rightarrow \frac{12}{(3+1)}$$

$$\frac{12}{4} \rightarrow \boxed{3}$$

$$3) 4+3+3-5-2$$

$$\boxed{7}+3-5-2$$

$$10-5-2$$

$$5-2$$

$$\boxed{3}$$

$$4) (12 \div 3 - 1 - (3 - 2)) \cdot 6$$

$$[12 \div 3 - 1 - 1] \cdot 6$$

$$[4 - 1 - 1] \cdot 6$$

$$[3 - 1] \cdot 6$$

$$2 \cdot 6$$

$$\boxed{12}$$

Evaluate each using the values given.

5)  $x - y^2$ ; use  $x = 6$ , and  $y = -4$

$$(6) - (-4)^2$$

$$6 - 16$$

$$\boxed{-10}$$

6)  $3cb$ ; use  $b = -2$ , and  $c = 6$

$$3(6)(-2)$$

$$18(-2)$$

$$\boxed{-36}$$

7)  $x\left(\frac{2}{2} - z\right)$ ; use  $x = -1$ , and  $z = 2$

$$(-1)(1 - (2))$$

$$(-1)(-1)$$

$$\boxed{1}$$

8)  $2 - z - \frac{x}{5}$ ; use  $x = -5$ , and  $z = -6$

$$2 - (-6) - \frac{(-5)}{5}$$

$$2 + (+6) + (+1)$$

$$8 + 1$$

$$\boxed{9}$$

Define all the following words.

9) Coefficient: number multiplied by variable

Variable: letter representing unknown number

Exponent: tells how many times to multiply something by itself

Constant: number without a variable

Terms: separated by + or - sign

Solve each equation.

$$10) -18 + n = -1$$

$$\begin{array}{r} -18 \quad \textcircled{+18} \\ \hline n = 17 \end{array}$$

$$11) 22 = 24(x)$$

$$\begin{array}{r} -2 \quad \textcircled{-2} \\ \hline 20 = x \end{array}$$

$$12) \frac{x}{5.2} = 5.5 \quad (5.2)$$

$$\boxed{x = 28.6}$$

$$\begin{array}{r} 5.5 \\ \times 5.2 \\ \hline 110 \\ 2750 \\ \hline 28.60 \end{array}$$

$$13) \frac{493}{11} = \frac{29}{3} p$$

$$\begin{array}{r} 1479 \\ \div 29 \\ \hline 319 = p \end{array}$$

$$\boxed{\frac{51}{11} = p}$$

$$\begin{array}{r} 493 \\ \times 3 \\ \hline 1479 \end{array}$$

$$\begin{array}{r} 29 \\ \times 11 \\ \hline 29 \\ 319 \end{array}$$

$$14) -128 = r + 4(3r - 6)$$

$$\begin{array}{r} -128 = r + 12r - 24 \\ \hline -128 = 13r - 24 \end{array}$$

$$\begin{array}{r} -128 = 13r - 24 \\ + 24 \quad \textcircled{+24} \\ \hline -104 = 13r \\ \div 13 \quad \div 13 \\ \hline -8 = r \end{array}$$

$$\boxed{-8 = r}$$

$$15) 188 = 4(4r - 1) + 8r$$

$$188 = 16r - 4 + 8r$$

$$\begin{array}{r} 188 = 24r - 4 \\ + 4 \quad \textcircled{+4} \\ \hline 192 = 24r \end{array}$$

$$\begin{array}{r} 192 = 24r \\ \div 24 \quad \div 24 \\ \hline 8 = r \end{array}$$

$$\boxed{8 = r}$$

$$16) -109 = -5 - 8(5 - 2n)$$

$$\begin{array}{r} -109 = -5 - 40 + 16n \\ \hline -109 = -45 + 16n \end{array}$$

$$\begin{array}{r} -109 = -45 + 16n \\ + 45 \quad \textcircled{+45} \\ \hline -64 = 16n \end{array}$$

$$\begin{array}{r} -64 = 16n \\ \div 16 \quad \div 16 \\ \hline n = -4 \end{array}$$

$$\boxed{n = -4}$$

$$17) -6 - 3x = -(3x + 8)$$

$$\begin{array}{r} -6 - 3x = -3x - 8 \\ + 3x \quad \textcircled{+3x} \\ \hline -6 = -8 \end{array}$$

$$-6 = -8$$

$$\boxed{\text{No solution}}$$

$$18) -2(1 + n) + 5 = -(2n - 3)$$

$$\begin{array}{r} -2 - 2n + 5 = -2n + 3 \\ \hline -2n + 3 = -2n + 3 \end{array}$$

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

$$\boxed{\text{Infinite}}$$

$$19) 4x + 2(3x + 6) = 2(6 - 6x)$$

$$\begin{array}{r} 4x + 6x + 12 = 12 - 12x \\ \hline 10x + 12 = 12 - 12x \end{array}$$

$$\begin{array}{r} 10x + 12 = 12 - 12x \\ + 12x \\ \hline 22x + 12 = 12 \end{array}$$

$$\begin{array}{r} 22x + 12 = 12 \\ -12 \quad -12 \\ \hline 22x = 0 \end{array}$$

$$\begin{array}{r} 22x = 0 \\ \div 22 \quad \div 22 \\ \hline x = 0 \end{array}$$

$$\boxed{x = 0}$$

$$20) 6(x+5) = -3(-8x+2)$$

$$\cancel{6x} + 30 = \cancel{24x} - 6$$

$$30 = \cancel{18x} - 6$$

$$\frac{36}{18} = \frac{18x}{18}$$

$$\boxed{2 = x}$$

$$22) 1.8x - 7.6 = 1.9(x + 0.8) + 1.5x$$

$$10) (1.8x - 7.6 = 1.9x + 1.52 + 1.5x)$$

$$1.8x - 7.6 = 1.9x + 1.52 + 1.5x$$

$$\cancel{1.8x} - 7.6 = \cancel{3.4x} + 1.52$$

$$-7.6 = 1.6x + 1.52$$

$$\frac{-2.28}{1.6} = \frac{1.6x}{1.6}$$

$$\boxed{x = -14.25 \text{ or } -57/4}$$

$$21) 2(4m-7) - 5.3 = -83.3$$

$$8m - 14 - 5.3 = -83.3$$

$$10) (8m - 19.3 = -83.3)$$

$$80m - 193 = -833$$

$$\frac{80m}{80} = \frac{-640}{80}$$

$$\boxed{m = -8}$$

$$23) \frac{8.5}{3}b - \frac{2.15}{7} = \frac{2.3}{5} - \frac{106}{15}$$

$$40b - 30 = -106$$

$$40b - 30 = -106$$

$$40b = -70$$

$$\boxed{b = -\frac{7}{4}}$$

Solve each equation for the indicated variable.

$$24) \frac{am}{m} = \frac{n+p}{m}, \text{ for } a$$

$$\boxed{a = \frac{n+p}{m}}$$

$$25) \frac{x}{r} = \frac{d}{r}, \text{ for } x$$

$$\boxed{x = \frac{dc}{r}}$$

$$26) \frac{8a}{8} = \frac{2w+4v}{8}, \text{ for } a$$

$$a = \frac{2w+4v}{8}$$

$$a = \frac{2w}{8} + \frac{4v}{8}$$

$$\boxed{a = \frac{1}{4}w + \frac{1}{2}v}$$

$$27) \frac{-x-2}{-1} = \frac{3r-d}{-1}, \text{ for } x$$

$$-x - 2 = 3r - d + 2$$

$$\boxed{x = -3r + d - 2}$$

- 28) Toucans and Macaws are both tropical birds. The length of an average toucan is about two-thirds of the length of an average Macaw. Toucans are about 24 in. long. What is the length of an average Macaw?

$$\frac{2}{3}M = T$$

$$\frac{3}{2} \cdot \frac{2}{3} M = \frac{12}{1} \cdot \frac{3}{2}$$

$$M = 36 \text{ in}$$

- 29) A delivery person uses a service elevator to bring boxes of books up to an office. The delivery person weighs 160 lbs and each box of books weighs 50 lbs. The maximum capacity of the elevator is 1000 lbs. How many boxes of books can the delivery person bring up at one time?

$b = \#$  of boxes

$$\begin{array}{r} 160 + 50b = 1000 \\ -160 \\ \hline 50b = 840 \\ \frac{50b}{50} = \frac{840}{50} \\ b = 16.8 \end{array}$$

He can bring 16 boxes at a time

- 30) The daily productions costs for a juice company are \$1200 per day on business expenses plus \$1.10 per bottle of juice they make. They charge \$2.50 for each bottle of juice they sell. How many bottles of juice must the company sell in one day to equal the daily cost of production?

$x = \#$  of bottles

They must sell 857 bottles a day

$$\begin{array}{r} \text{Costs} = \text{Sales} \\ 1200 + 1.1x = 2.5x \\ -1.1x \quad -1.1x \\ \hline 1200 = 1.4x \\ \frac{1200}{1.4} = \frac{1.4x}{1.4} \\ 857.14 = x \end{array}$$

$$\begin{array}{r} \text{or } (1200 + 1.1x = 2.5x) \\ 12,000 + 11x = 25x \\ -11x \quad -11x \\ \hline 12,000 = 14x \\ \frac{12,000}{14} = \frac{14x}{14} \\ 857.14 = x \end{array}$$

Complete the proof.

- 31) Prove: If  $4(a - 7) + 10(2a + 3) = 50$ , then  $x = 2$

1.  $4(a - 7) + 10(2a + 3) = 50$
2.  $4a - 28 + 20a + 30 = 50$
3.  $4a + 20a - 28 + 30 = 50$
4.  $(4a + 20a) - 28 + 30 = 50$
5.  $24a + 2 = 50$
6.  $24a = 48$
7.  $a = 2$

1. Given
2. Distributive Prop.
3. Commutative Prop.
4. Associative Prop.
5. Simplifying / Combine Like Terms
6. Subtraction Prop.
7. Division Prop.