

## Practice: Solving Equations

Directions: Solve each equation. You must show your work!

1)  $8x - 4 = 20$

$$\begin{array}{r} 8x - 4 = 20 \\ +4 \quad +4 \\ \hline 8x = 24 \end{array}$$

$$\boxed{x=3}$$

2)  $8 = 38 - 5x$

$$\begin{array}{r} 8 = 38 - 5x \\ -38 \quad -38 \\ \hline -30 = -5x \end{array}$$

$$\begin{array}{r} -30 = -5x \\ -5 \quad -5 \\ \hline 6 = x \end{array}$$

$$\boxed{6=x}$$

3)  $\frac{1}{3}x - 6 = 9$

$$\begin{array}{r} \frac{1}{3}x - 6 = 9 \\ +6 \quad +6 \\ \hline \frac{1}{3}x = 15 \end{array}$$

$$3 \cdot \frac{1}{3}x = 15 \cdot 3$$

$$\boxed{x=45}$$

4) Check your answer for #2.

$$8 = 38 - 5(6)$$

$$8 = 38 - 30$$

$$8 = 8 \checkmark$$

5) Solve and check:  $\frac{6}{5}a - 4 = 2$

$$\frac{6}{5} \cdot \frac{5}{6} a = 8 \cdot \frac{5}{6}$$

$$\boxed{a=5}$$

check

$$\frac{6}{5} \cdot 5 - 4 = 2$$

$$6 - 4 = 2$$

$$2 = 2 \checkmark$$

6)  $1\frac{2}{3}a = \frac{9}{2}$

$$3 \cdot \frac{5}{3} a = \frac{9}{2} \cdot \frac{3}{5}$$

$$\boxed{a = \frac{27}{10} \text{ or } 2\frac{7}{10} \text{ or } 2.7}$$

7)  $14n + 3 = 9n + 78$

$$\begin{array}{r} 14n + 3 = 9n + 78 \\ -9n \quad -9n \\ \hline 5n + 3 = 78 \end{array}$$

$$\begin{array}{r} 5n + 3 = 78 \\ -3 \quad -3 \\ \hline 5n = 75 \end{array}$$

$$\boxed{n=15}$$

8)  $2.5n - 15 = 4n$

$$\begin{array}{r} 2.5n - 15 = 4n \\ -2.5n \quad -2.5n \\ \hline -15 = 1.5n \end{array}$$

$$\frac{-15}{1.5} = \frac{1.5n}{1.5}$$

$$\boxed{-10 = n}$$

9)  $3n - 4 + n = 22$

$$\begin{array}{r} 4n - 4 = 22 \\ +4 \quad +4 \\ \hline 4n = 26 \end{array}$$

$$\frac{4n}{4} = \frac{26}{4}$$

$$n = \frac{26}{4} \rightarrow \boxed{n = \frac{13}{2} \text{ or } 6\frac{1}{2} \text{ or } 6.5}$$

10)  $19 = -3 + 7p + 1 - 4p$

$$\begin{array}{r} 19 = 3p - 2 \\ +2 \quad +2 \\ \hline 21 = 3p \end{array}$$

$$\frac{21}{3} = \frac{3p}{3}$$

$$\boxed{7=p}$$

11)  $3p - 5 = 8p + 45$

$$\begin{array}{r} 3p - 5 = 8p + 45 \\ -3p \quad -3p \\ \hline -5 = 5p + 45 \end{array}$$

$$\begin{array}{r} -5 = 5p + 45 \\ -45 \quad -45 \\ \hline -50 = 5p \end{array}$$

$$\frac{-50}{5} = \frac{5p}{5}$$

$$\boxed{-10=p}$$

12)  $1 - 2p = 5p + 25$

$$\begin{array}{r} 1 - 2p = 5p + 25 \\ +5p \quad +5p \\ \hline 1 + 3p = 25 \end{array}$$

$$\begin{array}{r} 1 + 3p = 25 \\ -1 \quad -1 \\ \hline 3p = 24 \end{array}$$

$$\boxed{p=8}$$

13)  $-9p + p + 6 = -3$

$$\begin{array}{r} -9p + p + 6 = -3 \\ -8p \quad -8p \\ \hline -8p = -9 \end{array}$$

$$\frac{-8p}{-8} = \frac{-9}{-8}$$

$$\boxed{p = \frac{9}{8} \text{ or } 1\frac{1}{8} \text{ or } 1.125}$$

14)  $4(x + 6) = 32$  (solve this TWO different ways)

Distributing first

$$\begin{array}{r} 4x + 24 = 32 \\ -24 \quad -24 \\ \hline 4x = 8 \end{array}$$

$$\frac{4x}{4} = \frac{8}{4}$$

$$\boxed{x=2}$$

Dividing first

$$\frac{4(x+6)}{4} = \frac{32}{4}$$

$$\begin{array}{r} x + 6 = 8 \\ -6 \quad -6 \\ \hline x = 2 \end{array}$$

$$\boxed{x=2}$$

15)  $-2(3a - 5) = 4(a + 10)$

$$\begin{array}{r} -6a + 10 = 4a + 40 \\ +6a \quad +6a \\ \hline 10 = 10a + 40 \end{array}$$

$$\begin{array}{r} 10 = 10a + 40 \\ -40 \quad -40 \\ \hline -30 = 10a \end{array}$$

$$\frac{-30}{10} = \frac{10a}{10}$$

$$\boxed{-3=a}$$

16) Check your answer for three of the problems from 7-15. (Answers vary)

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$$17) 5(12 - 4x) + 46 = 2(3x + 8) - 11x$$

$$60 - 20x + 46 = 6x + 16 - 11x$$

$$106 - 20x = -5x + 16$$

$$\frac{106}{-16} = \frac{15x + 16}{-16}$$

$$\frac{90}{15} = \frac{15x}{15} \quad \boxed{6 = x}$$

$$18) 20 - 2(x + 3) = 5 - (4 - 2x)$$

$$20 - 2x - 6 = 5 - 4 + 2x$$

$$14 - 2x = 1 + 2x$$

$$\frac{14}{-1} = \frac{1 + 2x}{-1}$$

$$\frac{13}{4} = \frac{2x}{4} \quad \boxed{x = \frac{13}{4} = 3\frac{1}{4} = 3.25}$$

$$19) \frac{9g + 30}{8} = 5g^{*3}$$

$$\frac{9g + 30}{9g} = \frac{15g}{9g}$$

$$\frac{30}{6} = \frac{6g}{6}$$

$$\boxed{5 = g}$$

$$20) \frac{3}{5}g - 5 = \frac{1}{5}g + 15$$

$$\frac{3g}{5} = \frac{10g}{5} + 20$$

$$\boxed{g = 50}$$

$$21) 3g - 5 + 10g + 11 - 9g = 17 + g - 23$$

$$13g + 6 - 9g = 9 - 6$$

$$\frac{4g + 6}{-9} = \frac{g - 6}{-9}$$

$$\frac{3g + 6}{-6} = \frac{-6}{-6}$$

$$3g = -12$$

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

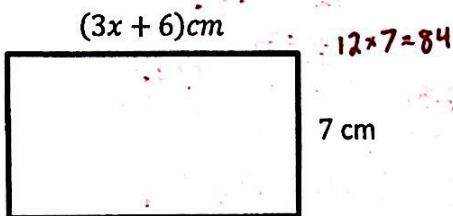
$$22) \frac{3}{4}w = \frac{1}{5}w + 33$$

$$\frac{15}{20}w = \frac{4}{20}w + 33$$

$$\frac{11}{20}w = \frac{33 \cdot 20}{11}$$

$$\boxed{w = 60}$$

23) If the area is 84 cm<sup>2</sup>, find the value of x.



$$(3x + 6) \cdot 7 = 84$$

$$21x + 42 = 84$$

$$21x = 42$$

$$\boxed{x = 2}$$

$$3x + 6 = 12$$

$$3x = 6$$

$$\boxed{x = 2}$$

25) Four consecutive integers have a sum of 90. Write and solve an equation to find the value of the four integers.

$$x + (x + 1) + (x + 2) + (x + 3) = 90$$

$$4x + 6 = 90$$

$$\frac{4x}{4} = \frac{84}{4}$$

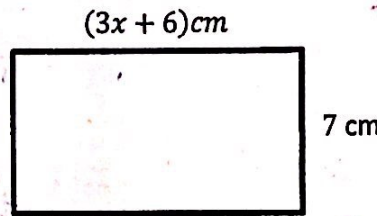
$$x = 21$$

$$\boxed{21, 22, 23, 24}$$

Check

$$\begin{array}{r} 21 \\ 22 \\ 23 \\ 24 \\ \hline 90 \end{array} \checkmark$$

24) If the perimeter is 62 cm, find the value of x.



$$(3x + 6) + 7 + (3x + 6) + 7 = 62$$

$$6x + 12 + 14 = 62$$

$$\frac{6x + 26}{-26} = \frac{62}{-26}$$

$$6x = 36$$

$$\boxed{x = 6}$$

26) Justin and Tyson are beginning an exercise program to train for football season. Justin weighs 150 lb and hopes to gain 2 lb per week. Tyson weighs 195 lb and hopes to lose 1 lb per week.

a. Write and solve an equation to find out when their weights will be the same.

b. When their weights are the same, what will that weight be?

	Justin	Tyson
a.	$150 + 2w$	$195 - 1w$
	+1w	+1w

$$\frac{150 + 3w}{-150} = \frac{195}{-150}$$

$$\frac{3w}{3} = \frac{45}{3}$$

$$w = 15$$

$$\boxed{\text{After 15 weeks}}$$

$$b. \begin{array}{r} 150 + 2(15) \\ 150 + 30 \\ 180 \end{array}$$

$$\begin{array}{r} 195 - 15 \\ 180 \end{array}$$

$$\boxed{180 \text{ lbs}}$$

27) 12 years ago, Juan was  $\frac{2}{3}$  the age he is now. Write and solve an equation to figure out how old he is now.

$$\frac{J - 12}{+12} = \frac{2}{3} \cdot \frac{J}{+12}$$

$$J = \frac{2}{3}J + 12$$

$$\frac{1}{3}J = 12$$

$$J = 36$$

$$\boxed{\text{Juan is 36.}}$$