

Study Guide 1.1 - 1.3 Solve Linear Equations**Matching**

Match the equation below with its first step in solving for the variable. Use each step only once.

- Subtract a constant from each side.
- Multiply each side by a constant.
- Use the Distributive Property.
- Combine like terms.

b 1. $-7 = \frac{n-7}{2}$

c 2. $3 = -3(y-5) - 2\left(y + \frac{1}{3}\right)$

a 3. $7 = \frac{m}{7} + 8$

d 4. $6 = \frac{9}{7}d + \frac{5}{8}d - 10$

Short Answer

Solve the equation. In some questions you are asked to check your answer and in others to justify your steps. Pay attention to what each question asks.

5. $d - 7 = -18$
+7 +7

$$d = -11$$

6. $\frac{-9h}{-9} = \frac{-27}{-9}$

$$h = 3$$

7. $\frac{w+3}{3} = -4$. Please check your solution.

$$3 \cdot \frac{w+3}{3} = -4 \cdot 3$$

$$\begin{array}{r} w+3 = -12 \\ -3 \quad -3 \end{array}$$

$$\boxed{w = -15}$$

Check: $\frac{-15+3}{3} \stackrel{?}{=} -4$

$$\frac{-12}{3} \stackrel{?}{=} -4$$

$$-4 = -4 \checkmark$$

8. $-66 = -9n + 16n + 4$. Justify each step of work with a property, theorem or definition that supports your work.

$$-66 = 7n + 4 \quad \text{Combine like terms}$$

$$\frac{-70}{7} = \frac{7n}{7} \quad \text{Subtraction Property of Equality}$$

$$\frac{-10}{1} = \frac{n}{1} \quad \text{Division Property of Equality}$$

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

9. $20(7-d) + 11d = 113$

$$140 - 20d + 11d = 113$$

$$\begin{array}{r} 140 - 9d = 113 \\ -140 \quad -140 \end{array}$$

$$\frac{-9d}{-9} = \frac{-27}{-9}$$

$$\boxed{d = 3}$$

10. $3(b+3) - 4(-2+b) = 19$, Check your answer.

$$3b + 9 + 8 - 4b = 19$$

$$\begin{array}{r} -b + 17 = 19 \\ -17 \quad -17 \end{array}$$

$$-b = 2$$

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

Check: $3(-2+3) - 4(-2+(-2)) \stackrel{?}{=} 19$

$$-6 + 9 + 8 + 8 \stackrel{?}{=} 19$$

$$3 + 16 \stackrel{?}{=} 19$$

$$19 = 19 \checkmark$$

11. $-2n - 10n + 3 = -n + 5$

$$\begin{array}{r} -12n + 3 = -n + 5 \\ +12n \quad +12n \end{array}$$

$$\begin{array}{r} 3 = 11n + 5 \\ -5 \quad -5 \end{array}$$

$$\frac{-2}{11} = \frac{11n}{11}$$

$$\boxed{\frac{-2}{11} = n}$$

12. $-29 - \frac{1}{5}n = \frac{3}{5}n$. Justify each step of work with a property, theorem or definition that supports your work.

$$+ \frac{1}{5}n \quad + \frac{1}{5}n \quad \text{Addition Property of Equality}$$

$$\frac{5}{4} \cdot \frac{-29}{1} = \frac{4}{5}n \cdot \frac{5}{4} \quad \text{Multiplication Property of Equality}$$

$$\boxed{\frac{-145}{4} = n}$$

$$= -36.25$$

Solve the equation. Determine whether the equation has *one solution*, *no solution*, or *infinitely many solutions*.

13. $-3(g-4) = 2-3g$

$$\begin{array}{r} -3g + 12 = 2 - 3g \\ +3g \qquad \qquad +3g \end{array}$$

$$12 = 2 \quad \text{False}$$

No solution

14. $-7(-3n+3) = -21+21n$

$$\begin{array}{r} 21n - 21 = -21 + 21n \\ -21n \qquad \qquad -21n \end{array}$$

$$-21 = -21 \quad \text{True}$$

Infinitely many solutions

15. $8(5z-7) = -4(-10z+14)$

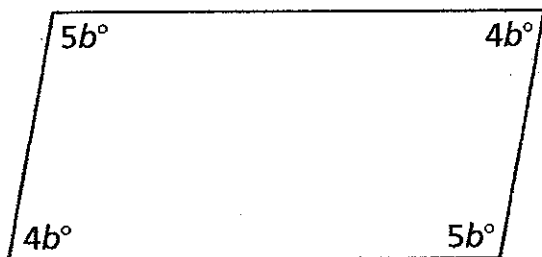
$$\begin{array}{r} 40z - 56 = 40z - 56 \\ -40z \qquad \qquad -40z \end{array}$$

$$-56 = -56 \quad \text{True}$$

Infinitely many solutions

Find the value of the variable. Then find the angle measures of the polygon.

16.



$$5b + 4b + 4b + 5b = 360$$

$$\frac{18b}{18} = \frac{360}{18}$$

$$b = 20$$

Sum of angle measures: 360°

$$20 \cdot 5 = 100$$

$$20 \cdot 4 = 80$$

Angle measures: $100^\circ, 80^\circ, 100^\circ, 80^\circ$

17. You are a contractor and charge $\$45$ for a site visit plus an additional $\$24$ per hour for each hour you spend working at the site. Write and solve an equation to determine how many total hours you have to work to earn $\$810$ working at two separate work sites.

Total = \$ \rightarrow means 2.45

x = hours working at site

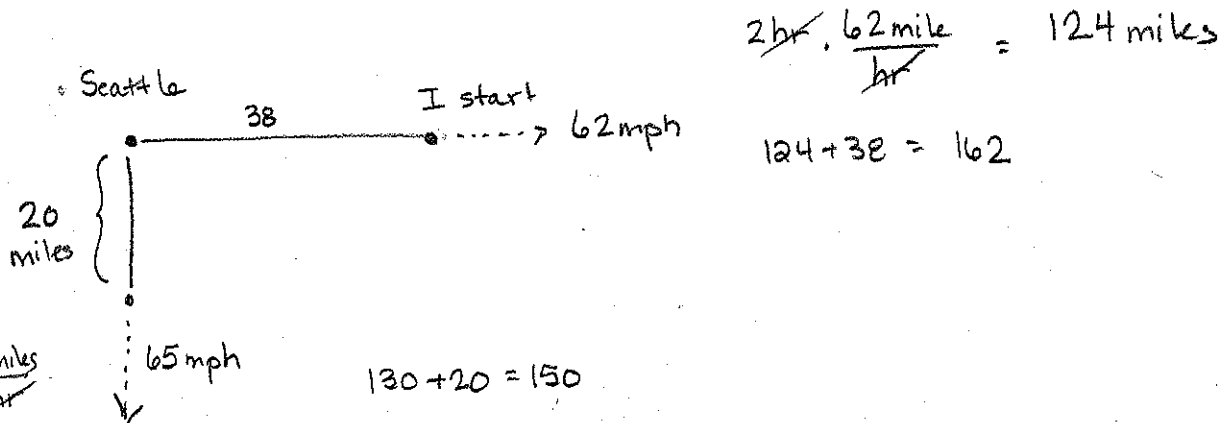
$$\begin{array}{r} 90 + 24x = 810 \\ - 90 \qquad - 90 \end{array}$$

$$\frac{24x}{24} = \frac{720}{24}$$

$$x = 30$$

You will have to work a total of 30 hours at two different work sites to earn \$810.

18. You and a friend are both traveling from the Seattle area. You start 38 miles east of Seattle and travel east on Interstate 90 at 62 miles per hour. Your friend starts 20 miles south of Seattle and travels south on Interstate 5 at 65 miles per hour.
- Who would be farther from Seattle in two hours and by how much?
 - How many hours will it take for you and your friend to be the same distance from Seattle?



$$\text{a) } \begin{array}{c} \text{Me} \\ 162 \end{array} - \begin{array}{c} \text{Friend} \\ 150 \end{array} = 12$$

I would be 12 miles farther from Seattle than my friend.

$$\text{b) } \begin{array}{c} \text{Me} \\ 38 + 62(x) \end{array} = \begin{array}{c} \text{Friend} \\ 20 + 65(x) \end{array}$$

x = hrs after which we will be same distance

$$38 + 62x = 20 + 65x$$

$$\begin{array}{r} -62x \\ -62x \end{array}$$

$$38 = 20 + 3x$$

$$\begin{array}{r} -20 \\ -20 \end{array}$$

$$\frac{18}{3} = \frac{3x}{3}$$

$$6 = x$$

After 6 hours my friend and I will be the same distance from Seattle.