

Topic 2 Mid-Topic Review Worksheet

Name _____

For questions 1-6, solve the following equations for x :

1. $\frac{2x+6}{4} = -8$

2. $6x - 5 = 2(3x + 4)$

3. $2x - 5(x + 4) = 16$

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

5. $\frac{3}{5}x - 9 = 21$

6. $-4x - 8 = 10x + 6$

$$\begin{array}{l} \text{(Earnings)} \quad \text{(Tips)} \quad + \quad \text{(Wage)} \quad \text{(# hrs)} \\ \text{Total} = \text{Start\#} + \text{Rate} \cdot \text{How Many?} \end{array}$$

7. Jared works as a food server in a restaurant earning \$3.50 an hour plus tips.

a) One night Jared worked an 8 hour shift and took home \$45.00 in tips. How much total did he make for the night? Write an equation and show all work to answer the question.

b) If Jared makes \$225 in tips for the week and his total earnings were \$358. How many hours did he work?

For questions 1-6, solve the following equations for x :

1. $3x + 2 = 2(4x + 1) - 5x$

2. $-\frac{4}{7}x + 1 = 25$

3. $7 - 3(4x - 1) = 22$

4. $\frac{5x-3}{8} = -9$

5. $-3x - 9 = 12x + 6$

6. $6x + 2(4x - 4) = 15x - (2x - 2) + 8$

$$\begin{aligned} \text{Cost} &= (\$20) + (0.8) \cdot \text{\#ofmiles} \\ \text{Total} &= \text{Start} + \text{Rate} \cdot (\text{How Many}) \end{aligned}$$

7. A car rental company charges \$20 to rent a car plus \$0.80 per mile driven.

a) How much would it cost to rent a car to drive 350 miles?

b) If a family only has \$100 to spend on a car rental, how many miles can they drive?

Write an equation and show all work to answer the question.

Combine Like Terms to Solve Equations

Quick Review

You can use variables to represent unknown quantities. To solve an equation, collect like terms to get one variable on one side of the equation. Then use inverse operations and properties of equality to solve the equation.

Example

Solve $5x + 0.45x = 49.05$ for x .

Guided Practice:

$$\begin{array}{r} 5x + 0.45x = 49.05 \\ \underline{5.45x} \quad \underline{49.05} \\ \underline{5.45} \quad \underline{5.45} \\ x = 9 \end{array}$$

Practice

Solve each equation for x .

1. $2x + 6x = 1,000$

2. $2\frac{1}{4}x + \frac{1}{2}x = 44$

$$4\left(\frac{5}{4}x + \frac{1}{2}x\right) = (44)4$$

3. $-2.3x - 4.2x = -66.3$

4. Javier bought a microwave for \$105. The cost was 30% off the original price. What was the price of the microwave before the sale?

Let $x =$ the original price

$$x - 0.3x = 105$$

LESSON 2-2

Solve Equations with Variables on Both Sides

Quick Review

If two quantities represent equal amounts and have the same variables, you can set the expressions equal to each other. Collect all the variables on one side of the equation and all the constants on the other side. Then use inverse operations and properties of equality to solve the equation.

Example

Solve $2x + 21 = 7x + 6$ for x .

Guided Practice:

$$\begin{array}{r} 2x + 21 = 7x + 6 \\ \underline{+ (-2x)} \quad \underline{-2x} \\ 21 = 5x + 6 \\ \underline{-6} \quad \underline{-6} \\ 15 = 5x \\ \underline{5} \quad \underline{5} \\ x = 3 \end{array}$$

Practice

Solve each equation for x .

1. $3x + 9x = 6x + 42$

2. $\frac{4}{3}x + \frac{2}{3}x = \frac{1}{3}x + 5$

3. $9x - 5x + 18 = 2x + 34$

4. Megan has \$50 and saves \$5.50 each week. Connor has \$18.50 and saves \$7.75 each week. After how many weeks will Megan and Connor have saved the same amount?

Let $w =$ number of weeks

$$50 + 5.5w = 18.5 + 7.75w$$

When solving multistep equations, sometimes the Distributive Property is used before you collect like terms. Sometimes like terms are collected, and then you use the Distributive Property.

Example

Solve $8x + 2 = 2x + 4(x + 3)$ for x .

Guided Practice:

$$\begin{array}{r}
 8x + 2 = 2x + 4(x + 3) \\
 8x + 2 = 2x + 4x + 12 \\
 8x + 2 = 6x + 12 \\
 \underline{-6x \quad -6x} \\
 2x + 2 = 12 \\
 \underline{-2 \quad -2} \\
 2x = 10 \\
 \underline{\quad \quad 2 \quad \quad 2} \\
 x = 5
 \end{array}$$

Practice

Solve each equation for x .

1. $4(x + 4) + 2x = 52$

2. $8(2x + 3x + 2) = -4x + 148$

3. Justin bought a calculator and a binder that were both 15% off the original price. The original price of the binder was \$6.20. Justin spent a total of \$107.27. What was the original price of the calculator?

Let $c =$ original calculator price

$$[c - 0.15c] + [6.20 - 0.15(6.20)] = 107.27$$

LESSON 2-4 Equations with No Solutions or Infinitely Many Solutions (All Real #s)

Quick Review

When solving an equation results in a statement that is always true, there are infinitely many solutions. When solving an equation produces a false statement, there are no solutions. When solving an equation gives one value for a variable, there is one solution.

Example

How many solutions does the equation $6x + 9 = 2x + 4 + 4x + 5$ have?

Guided Practice:

$$\begin{array}{r}
 6x + 9 = 2x + 4 + 4x + 5 \\
 6x + 9 = 6x + 9 \\
 \underline{-6x \quad -6x} \\
 9 = 9
 \end{array}$$

All Real #s
so infinite # of solutions

Practice

How many solutions does each equation have?

1. $x + 5.5 + 8 = 5x - 13.5 - 4x$

2. $4\left(\frac{1}{2}x + 3\right) = 3x + 12 - x$

3. $2(6x + 9 - 3x) = 5x + 21$

4. The weight of Abe's dog can be found using the expression $2(x + 3)$, where x is the number of weeks. The weight of Karen's dog can be found using the expression $3(x + 1)$, where x is the number of weeks. Will the dogs ever be the same weight? Explain.

Let $x =$ number of weeks

$$2(x + 3) \stackrel{?}{=} 3(x + 1)$$