

## Warm-Up

$$\frac{-x-2}{-4} = \frac{3x+6}{2}$$

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

$$\begin{array}{r} -2x - 4 \\ +12x \end{array} = \begin{array}{r} -12x - 24 \\ +12x \end{array}$$

$$\begin{array}{r} 10x - 4 \\ +4 \end{array} = \begin{array}{r} -24 \\ +4 \end{array}$$

$$\frac{10x}{10} = \frac{-20}{10}$$

$$x = -2$$

## Practice Answers

1.  $\frac{5}{6x-2} = \frac{-1}{x+1}$

$$\begin{aligned}\frac{5}{6x-2} &= \frac{-1}{x+1} \\ 5(x+1) &= -1(6x-2) \\ 5x+5 &= -6x+2 \\ 5x+5-5 &= -6x+2-5 \\ 5x &= -6x-3 \\ 5x+6x &= -6x+6x-3 \\ 11x &= -3 \\ x &= -\frac{3}{11}\end{aligned}$$

$$3. \quad \frac{3x}{x+2} = \frac{5}{9}$$

$$\frac{3x}{x+2} = \frac{5}{9}$$

$$9(3x) = (x+2)5$$

$$27x = 5x + 10$$

$$27x - 5x = 5x - 5x + 10$$

$$22x = 10$$

$$\frac{22}{22}x = \frac{10}{22}$$

$$x = \frac{5}{11}$$

$$5. \quad \frac{7 - 2x}{6} = \frac{x - 5}{1}$$

$$\frac{7 - 2x}{6} = \frac{x - 5}{1}$$

$$6(x - 5) = (7 - 2x)1$$

$$6x - 30 = 7 - 2x$$

$$6x - 30 + 30 = 7 + 30 - 2x$$

$$6x = 37 - 2x$$

$$6x + 2x = 37 - 2x + 2x$$

$$8x = 37$$

$$\frac{8}{8}x = \frac{37}{8}$$

$$x = \frac{37}{8}$$

$$7. \quad \frac{6x+1}{3} = \frac{9-x}{7}$$

$$\frac{6x+1}{3} = \frac{9-x}{7}$$

$$(6x+1)7 = 3(9-x)$$

$$42x+7 = 27-3x$$

$$42x+7-7 = 27-7-3x$$

$$42x = 20-3x$$

$$42x+3x = 20-3x+3x$$

$$45x = 20$$

$$\frac{45}{45}x = \frac{20}{45}$$

$$x = \frac{4}{9}$$

$$9. \quad \frac{3-x}{1-x} = \frac{3}{2}$$

$$\frac{3-x}{1-x} = \frac{3}{2}$$

$$(3-x)2 = (1-x)3$$

$$6 - 2x = 3 - 3x$$

$$6 - 2x + 2x = 3 - 3x + 2x$$

$$6 = 3 - x$$

$$6 - 3 = 3 - 3 - x$$

$$3 = -x$$

$$-3 = x$$

Classwork

Example 1

$$\begin{array}{r}
 11 \\
 12.5 \overline{) 137.5} \\
 \underline{-125} \phantom{0} \\
 125 \\
 \underline{-125} \\
 0
 \end{array}$$

$$\frac{25 \text{ minutes}}{2 \text{ miles}} = \frac{137.5 \text{ min}}{x \text{ mi}}$$

Paul walks 2 miles in 25 minutes. How many miles can Paul walk in 137.5 minutes?

$$\begin{array}{r}
 \underline{25 \text{ minutes}} \\
 2 \text{ miles} \\
 \\
 \underline{12.5 \text{ minutes}} \\
 1 \text{ mile}
 \end{array}$$

Time (in minutes)	Distance (in miles)
25	2
50	4
75	6
100	8
125	10
137.5	11
150	12

Exercises

$mph = \frac{mi}{hr}$  ← time on bottom

1. Wesley walks at a constant speed from his house to school 1.5 miles away. It took him 25 minutes to get to school.  
 a. What fraction represents his constant speed,  $C$ ?

$$C = \frac{1.5 \text{ mi}}{25 \text{ min}} = \frac{1.5}{25}$$

- b. You want to know how many miles he has walked after 15 minutes. Let  $y$  represent the distance he traveled after 15 minutes of walking at the given constant speed. Write a fraction that represents the constant speed,  $C$ , in terms of  $y$ .

$$C = \frac{y \text{ mi}}{15 \text{ min}}$$

- c. Write the fractions from parts (a) and (b) as a proportion, and solve to find how many miles Wesley walked after 15 minutes.

$$\frac{1.5 \text{ mi}}{25 \text{ min}} = \frac{y \text{ mi}}{15 \text{ min}}$$

$$25y = (15)(1.5)$$

$$\frac{25y}{25} = \frac{22.5}{25}$$

- d. Let  $y$  be the distance in miles that Wesley traveled after  $x$  minutes. Write a linear equation in two variables that represents how many miles Wesley walked after  $x$  minutes.

$y = 0.9 \text{ mi}$

$$C = \frac{y}{x} = \frac{1.5}{25}$$

← from part (a)

$$\frac{25y}{25} = \frac{1.5x}{25}$$

$$y = \frac{1.5}{25} \cdot x$$

2. Stefanie drove at a constant speed from her apartment to her friend's house 20 miles away. It took her 45 minutes to reach her destination.

a. What fraction represents her constant speed,  $C$ ?

$$C = \frac{20 \text{ miles}}{45 \text{ minutes}}$$

b. What fraction represents constant speed,  $C$ , if it takes her  $x$  number of minutes to get halfway to her friend's house?

10 miles

$$C = \frac{10 \text{ miles}}{x \text{ minutes}}$$

c. Write and solve a proportion using the fractions from parts (a) and (b) to determine how many minutes it takes her to get to the halfway point.

~~$$\frac{20}{45} = \frac{10}{x}$$~~

$$(45)(10) = 20x$$

$$\frac{450}{20} = \frac{20x}{20}$$

$$x = 22.5 \text{ minutes}$$

d. Write a two-variable equation to represent how many miles Stefanie can drive over any time interval  $x$  minutes.

~~$$C = \frac{y}{x} = \frac{20}{45}$$~~

~~$$\frac{45y}{45} = \frac{20x}{45}$$~~

$$y = \frac{20}{45}x$$

$$y = \frac{4}{9}x$$

3. The equation that represents how many miles,  $y$ , Dave travels after  $x$  hours is  $y = 50x + 15$ . Use the equation to complete the table below.

$x$ (hours)	Linear Equation: $y = 50x + 15$	$y$ (miles)
1	$y = 50(1) + 15$	65
2	$y = 50(2) + 15$	115
3	$y = 50(3) + 15$	165
3.5	$y = 50(3.5) + 15$	190
4.1	$y = 50(4.1) + 15$	220

