

$$\begin{aligned} 1) \quad 4x + 3y &= -8 \\ -8x + y &= -12 \\ +8x & \quad +8x \end{aligned}$$

$$\boxed{y = 8x - 12}$$

$$(1, -4)$$

$$\begin{aligned} 4x + 3(8x - 12) &= -8 \\ 4x + 24x - 36 &= -8 \\ 28x - 36 &= -8 \\ +36 & +36 \\ 28x &= 28 \\ \boxed{x = 1} \end{aligned}$$

$$\begin{aligned} y &= 8(1) - 12 \\ y &= 8 - 12 \\ \boxed{y = -4} \end{aligned}$$

$$\begin{aligned} 2) \quad 4x - 2y &= 8 \\ y &= -2 \end{aligned}$$

$$\begin{aligned} 4x - 2(-2) &= 8 \\ 4x + 4 &= 8 \\ -4 & -4 \\ 4x &= 4 \\ \frac{4x}{4} &= \frac{4}{4} \end{aligned}$$

$$\boxed{x = 1}$$

$$(1, -2)$$

$$\begin{aligned} 4(1) - 2y &= 8 \\ 4 - 2y &= 8 \\ -4 & -4 \\ -2y &= 4 \\ \frac{-2y}{-2} &= \frac{4}{-2} \end{aligned}$$

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

$$\begin{aligned} 3) \quad 14x - 2y &= 46 \\ -7x + y &= -23 \\ +2x & \quad +2x \end{aligned}$$

$$y = 7x - 23$$

$$\begin{aligned} 14x - 2(7x - 23) &= 46 \\ 14x - 14x + 46 &= 46 \\ -44 & -44 \end{aligned}$$

$$\boxed{0 = 0}$$

Infinite number of solutions.

$$4) \begin{cases} 5x + y = 8 \\ -3x + 2y = -10 \end{cases}$$

$$\begin{array}{r} 5x + y = 8 \\ -5x \quad -5x \end{array}$$

$$y = -5x + 8$$

$$-3x + 2(-5x + 8) = -10$$

$$-3x + 10x + 16 = -10$$

$$\begin{array}{r} -13x + 16 = -10 \\ \quad \quad \quad \cancel{16} \quad \quad -16 \end{array}$$

$$\begin{array}{r} -13x = -26 \\ \quad \quad \quad \cancel{-13} \quad \quad \quad \cancel{-13} \end{array}$$

$$\boxed{x = 2}$$

$$y = -5(2) + 8$$

$$= -10 + 8$$

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

$$(2, -2)$$

$$5) \begin{cases} 10x - 8y = 4 \\ 2(-5x + 3y) = -9 \end{cases}$$

$$\begin{array}{r} 10x - 8y = 4 \\ -10x + 6y = -18 \end{array}$$

$$\begin{array}{r} -2y = -14 \\ \quad \quad \quad \cancel{-2} \quad \quad \quad \cancel{-2} \end{array}$$

$$\boxed{y = 7}$$

$$10x - 8(7) = 4$$

$$10x - 56 = 4$$

$$\begin{array}{r} +56 \quad +56 \end{array}$$

$$\begin{array}{r} 10x + 60 \\ \quad \quad \quad \cancel{10} \quad \quad \quad \cancel{10} \end{array}$$

$$\boxed{x = 6}$$

$$(6, 7)$$

$$6) \begin{cases} -15x + 9y = 27 \\ -3(-5x - y) = 17 \end{cases}$$

$$\begin{array}{r} -15x + 9y = 27 \\ 15x + 3y = -51 \end{array}$$

$$\begin{array}{r} 12y = -24 \\ \quad \quad \quad \cancel{12} \quad \quad \quad \cancel{12} \end{array}$$

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

$$-15x + 9(-2) = 27$$

$$-15x + (-18) = 27$$

$$\begin{array}{r} +18 \quad +18 \end{array}$$

$$-15x = 45$$

$$\begin{array}{r} \quad \quad \quad \cancel{-15} \quad \quad \quad \cancel{-15} \end{array}$$

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

$$(-3, -2)$$

$$\begin{array}{l} 7) \quad -7x - 8y = -23 \\ \quad 2(4x + 4y = 12) \end{array}$$

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$$4(1) + 4y = 12$$

$$\begin{array}{r} 4 + 4y = 12 \\ -4 \quad -4 \end{array}$$

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

$$\boxed{y = 2}$$

(1, 2)

$$\begin{array}{l} -7x - 8y = -23 \\ 8x + 8y = 24 \end{array}$$

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$$\boxed{x = 1}$$

$$\begin{array}{l} 8) \quad -3x - 10y = -4 \\ \quad 3(x - 5y = 18) \end{array}$$

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$$x - 5(-2) = 18$$

$$\begin{array}{r} x + 10 = 18 \\ -10 \quad -10 \end{array}$$

$$\boxed{x = 8}$$

(x, y)

(8, -2)

$$-3x - 10y = -4$$

$$3x - 15y = 54$$

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$$\begin{array}{r} -25y = 50 \\ -25 \quad -25 \end{array}$$

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

**Practice: Solving Systems of Equations (3 Different Methods)**

Date \_\_\_\_\_

**Solve each system by substitution.**

1)  $4x + 3y = -8$   
 $-8x + y = -12$

2)  $4x - 2y = 8$   
 $y = -2$

3)  $14x - 2y = 46$   
 $-7x + y = -23$

4)  $5x + y = 8$   
 $-3x + 2y = -10$

**Solve each system by elimination.**

5)  $10x - 8y = 4$   
 $-5x + 3y = -9$

6)  $-15x + 9y = 27$   
 $-5x - y = 17$

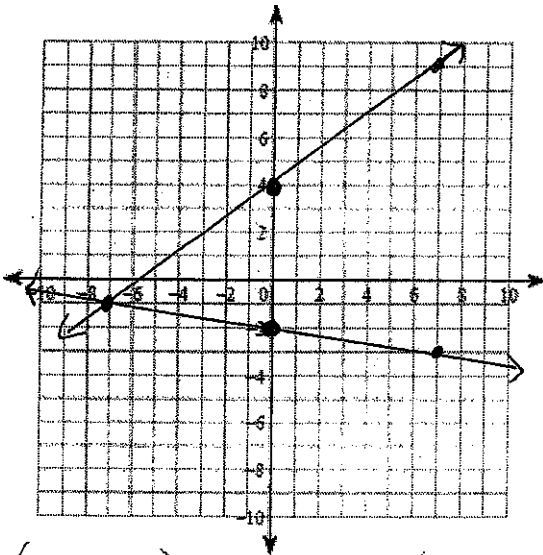
7)  $-7x - 8y = -23$   
 $4x + 4y = 12$

8)  $-3x - 10y = -4$   
 $x - 5y = 18$

**Solve each system by graphing.**

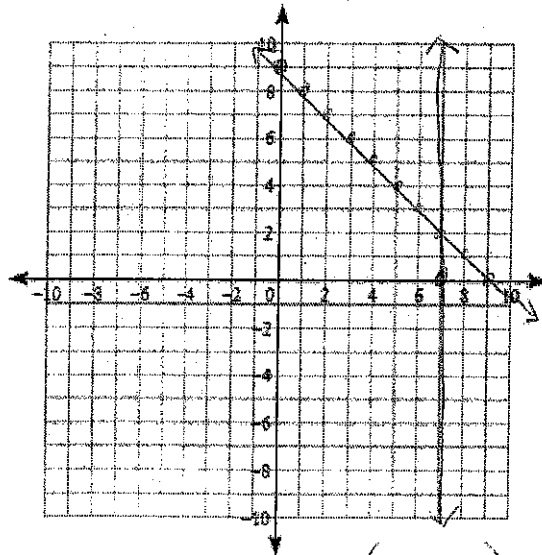
9)  $y = \frac{5}{7}x + 4$

$y = -\frac{1}{7}x - 2$



$(-7, -1)$

10)  $x = 7$   
 $y = -x + 9$



$(7, 2)$

- 11) The senior classes at High School A and High School B planned separate trips to the state fair. The senior class at High School A rented and filled 10 vans and 6 buses with 276 students. High School B rented and filled 5 vans and 2 buses with 117 students. Every van had the same number of students in it as did the buses. How many students can a van carry? How many students can a bus carry?

$x = \#$  of students in a van  
 $y = \#$  of students in a bus

Van can carry 15  
 Bus can carry 21

$$\begin{aligned} 10x + 6y &= 276 \\ -3(5x + 2y &= 117) \end{aligned}$$

$$\begin{aligned} 10(15) + 6y &= 276 \\ -150 + 6y &= 276 \\ 6y &= 426 \\ y &= 71 \end{aligned}$$

$$y = 21$$

$$\begin{aligned} 10x + 6y &= 276 \\ -15x - 6y &= -351 \end{aligned}$$

$$\begin{aligned} -5x &= -75 \\ -5 & \quad -5 \end{aligned}$$

$$x = 15$$

- 12) New York City is a popular field trip destination. This year the senior class at High School A and the senior class at High School B both planned trips there. The senior class at High School A rented and filled 1 van and 6 buses with 324 students. High School B rented and filled 9 vans and 3 buses with 264 students. Every van had the same number of students in it as did the buses. How many students can a van carry? How many students can a bus carry?

$x = \#$  of students in a van  
 $y = \#$  of students in a bus

Van can carry 12  
 Bus can carry 52

$$\begin{aligned} 1x + 6y &= 324 \\ -2(9x + 3y &= 264) \end{aligned}$$

$$12 + 6y = 324$$

$$\begin{aligned} 6y &= 312 \\ y &= 52 \end{aligned}$$

$$\begin{aligned} 1x + 6y &= 324 \\ -18x - 6y &= -528 \end{aligned}$$

$$\begin{aligned} -17x &= -204 \\ -17 & \quad -17 \end{aligned}$$

$$x = 12$$

- 13) A boat traveled 280 miles downstream and back. The trip downstream took 7 hours. The trip back took 14 hours. Find the speed of the boat in still water and the speed of the current.

- 14) A boat traveled 252 miles downstream and back. The trip downstream took 12 hours. The trip back took 84 hours. What is the speed of the boat in still water? What is the speed of the current?