

Algebra 2

2.6 Solve systems of linear equations.

A solution to a system of linear equations is an ordered pair (x, y) that satisfies both equations. $y = -\frac{3}{2}x + \frac{3}{2}$

Solve by substitution & elimination for practice. $y = -\frac{2}{3}x - 1$

Then graph as well.

Example 1)

$$\begin{cases} 10(0.3x + 0.2y = 0.3) \\ 10(0.2x + 0.3y = -0.3) \end{cases}$$

$$3x + 2y = 3$$

$$2x + 3y = -3$$

Substitution

$$\frac{2y}{2} = \frac{-3x + 3}{2}$$

$$y = \left(-\frac{3}{2}x + \frac{3}{2}\right)$$

$$2x + 3\left(-\frac{3}{2}x + \frac{3}{2}\right) = -3$$

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

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

$$-\frac{2}{5} \cdot -\frac{5}{2}x = -\frac{15}{2} \cdot -\frac{2}{5}$$

$$x = 3$$

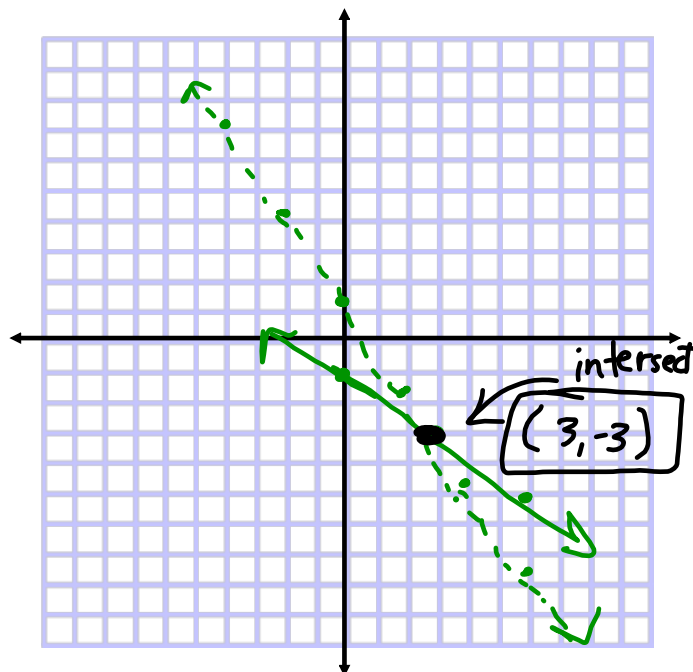
$$3(3) + 2y = 3$$

$$9 + 2y = 3$$

$$2y = -6$$

$$y = -3$$

$$(3, -3)$$



Elimination

$$\begin{array}{r} -2(3x + 2y = 3) \\ 3(2x + 3y = -3) \end{array}$$

$$\begin{array}{r} -6x - 4y = -6 \\ + 6x + 9y = -9 \\ \hline \end{array}$$

$$5y = -15$$

$$y = -3$$

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

$$3x + -6 = 3$$

$$\frac{3x}{3} = \frac{9}{3}$$

$$x = 3$$

$$(3, -3)$$

Solve using any algebraic method.

$$\begin{aligned} \text{ex) } 12x - 3y &= -9 \\ 3(-4x + y &= 3) \\ -12x + 3y &= 9 \\ 0 + 0 &= 0 \\ y &= 4x + 3 \end{aligned}$$

$$12x - 3(4x + 3) = -9$$

$$12x - 12x - 9 = -9$$

$$-9 = -9$$

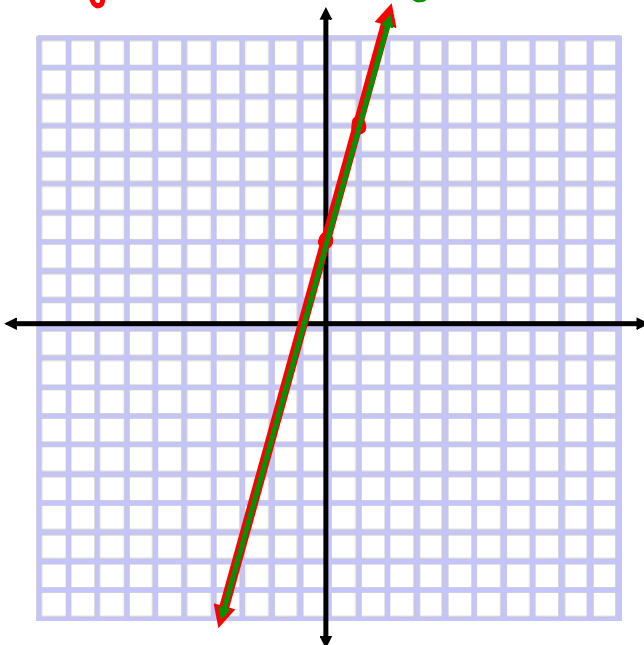
Infinite Sol'n's

$$\begin{aligned} \text{ex) } 3(3x - \frac{5}{3}y &= 5) \\ 15(-\frac{3}{5}x + \frac{1}{3}y &= -5) \\ 9x - 5y &= 15 \\ + -9x + 5y &= -75 \\ 0 + 0 &= -60 \\ \text{False} \end{aligned}$$

\emptyset No sol'n

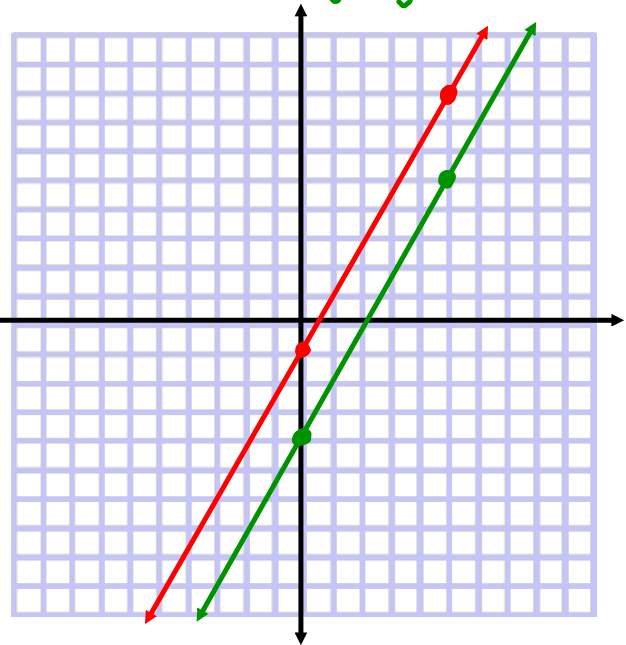
$$\begin{aligned} 12x - 3y &= -9 \\ -3y &= -12x - 9 \\ y &= 4x + 3 \end{aligned}$$

$$\begin{aligned} -4x + y &= 3 \\ y &= 4x + 3 \end{aligned}$$

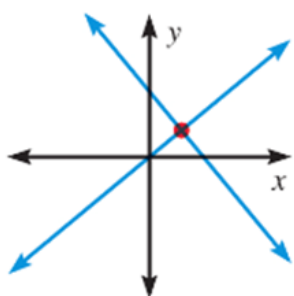


$$\begin{aligned} 9x - 5y &= 5 \\ -5y &= -9x + 5 \\ y &= \frac{9}{5}x - 1 \end{aligned}$$

$$\begin{aligned} -9x + 5y &= -75 \\ 5y &= 9x - 15 \\ y &= \frac{9}{5}x - 3 \end{aligned}$$

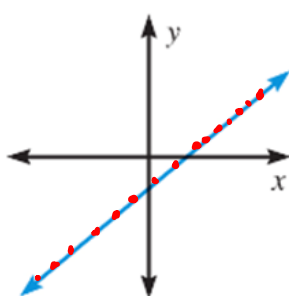


Exactly one solution



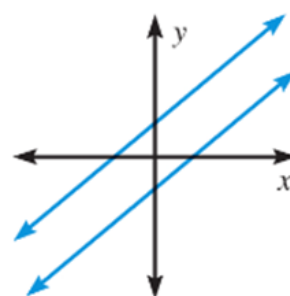
Lines intersect at one point

Infinitely many solutions



Lines coincide

No solution



Lines are parallel

One number is four times another number and their sum is 175. Find the numbers.

$$\text{let } x = 1^{\text{st}} \#$$

$$\text{let } y = 2^{\text{nd}} \#$$

$$\begin{aligned} (4x) &= y \\ x + (y) &= 175 \end{aligned}$$

$$\begin{aligned} x + 4x &= 175 \\ \frac{5x}{5} &= \frac{175}{5} \end{aligned}$$

$$\begin{aligned} x &= 35 \\ y &= 4(35) \\ y &= 140 \end{aligned}$$

$$(35, 140)$$

One week a business sold 40 scarves. White ones cost \$4.95, and printed ones cost \$7.95. In all, \$282 worth of scarves were sold. How many of each kind were sold?

let $x =$ white scarves

let $y =$ printed scarves

$$4.95x + 7.95y = 282$$

$$\begin{array}{r} x + y = 40 \\ -y \quad -y \\ \hline x = (40 - y) \end{array}$$

$$40 - 28 = x$$

28 Printed scarves

12 White scarves

$$4.95(40 - y) + 7.95y = 282$$

$$198 - 4.95y + 7.95y = 282$$

$$198 + 3y = 282$$

$$\begin{array}{r} 3y = 84 \\ \hline y = 28 \end{array}$$

$$y = 28$$

Which ordered pair is a solution to the system?

$$\textcircled{1} y = -x^2 - 2x + 8$$

$$\textcircled{2} y = x^2 + 7x + 12$$

~~A. (-3, 2)~~

~~B. (4, 0)~~

~~C. (1, 5)~~

$$\boxed{\text{D. } (-5, 2)}$$

$$(-3, 2) \quad \textcircled{1} \quad 2 = -(-3)^2 - 2(-3) + 8$$

$$= -9 + 6 + 8$$

$$2 = 5 \quad \text{F}$$

$$(4, 0) \quad \textcircled{1} \quad 0 = -(4)^2 - 2(4) + 8$$

$$0 = -16 - 8 + 8$$

$$\text{F}$$

$$\begin{matrix} x & y \\ (-5, 2) \end{matrix} \quad \textcircled{1} \quad 2 = -(-5)^2 - 2(-5) + 8$$

$$= -25 + 10 + 8$$

$$= -15 + 8$$

$$2 = -7 \quad \text{F}$$

$$(1, 5) \quad \textcircled{1} \quad 5 = -(1)^2 - 2(1) + 8$$

$$= -1 - 2 + 8$$

$$= -3 + 8$$

$$5 = 5 \quad \text{T}$$

$$\textcircled{2} \quad 5 = 1^2 + 7(1) + 12$$

$$5 = 1 + 7 + 12$$

$$\text{F}$$

Algebra 2
2.6 Solving Systems of Equations

Name: _____ Date: _____ Hr: _____

Solve the systems of equations using any algebraic method.

1) $0.7x - 0.3y = 0.5$
 $-0.4x + 0.7y = 1.3$

2) $\frac{3}{5}x + \frac{2}{3}y = 14$
 $\frac{3}{4}x - \frac{1}{3}y = 14$

3) $-8x - 9y = -12$
 $-2x - \frac{9}{4}y = -3$

4) $4x - 6y = 12$
 $-6x + 9y = 18$

5.

What is the value of y in the solution to the system?

$$\begin{aligned}4x - y &= 4 \\6x - 5y &= -1\end{aligned}$$

A) -2

B) 1.5

C) 2

D) 8

6) Tickets for the school play cost \$5 for adults and \$3 for students. On opening night, 150 tickets were sold and \$560 was collected. How much was collected from the sale of student tickets?

A) \$55

C) \$275

B) \$95

D) \$285

7) At a club play, 117 tickets were sold. Adults' tickets cost \$1.25, and children's tickets cost \$0.75. In all, \$129.75 was taken in. How many of each kind of ticket were sold?

8) The difference between two numbers is 11. Twice the smaller number plus three times the larger number is 123. What are the numbers?

9) The sum of two numbers is -63. The first number minus the second is -41. Find the numbers.

10) Which ordered pair is a solution to the system?

$$y = -2x^2 + x - 3$$

$$y = \frac{1}{2}x^2 - 4x - 3$$

A. (-3, 0)

B. (1, -4)

C. (-1, 3/2)

D. (0, -3)