

Monday 12/9

Graph and identify the key features for the function

$$f(x) = 2x - 4.$$

Slope: $m = 2$

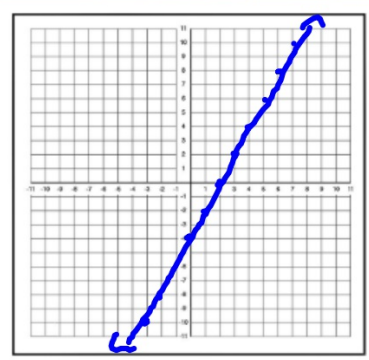
x-int: $(2, 0)$

y-int: $(0, -4)$

Domain: $-\infty < x < \infty$

Range: $-\infty < y < \infty$

Zero: $(2, 0)$



Solving Systems by Elimination

The final method for solving systems of linear equations is elimination.

This method works by stacking and combining two equations written in standard form. This method uses the zero pair to eliminate a variable. Then we solve for one variable and plug in or evaluate to find the second variable.

Example 1: Solving Systems of Equations by Elimination

Solution
(0, 2)

$$\begin{array}{r} 3x + 2y = 4 \\ + \quad 3x - 2y = -4 \\ \hline 6x = 0 \\ \frac{6}{6} = \frac{0}{6} \\ x = 0 \end{array}$$

$$\begin{array}{r} 3(0) + 2y = 4 \\ 2y = 4 \\ \frac{2y}{2} = \frac{4}{2} \\ y = 2 \end{array}$$

$$\begin{array}{r} \cancel{3x} + 2y = 7 \\ + \cancel{-3x} + 4y = 5 \\ \hline \end{array}$$

$$\frac{6y = 12}{6} \quad \frac{6}{6}$$

$$y = 2$$

$$3x + 2(2) = 7$$

$$\begin{array}{r} 3x + 4 = 7 \\ -4 \quad -4 \\ \hline \end{array}$$

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

$$x = 1$$

Solution: (1, 2)

$$\begin{array}{r} 3x - 4y = 18 \\ + \cancel{-2x} + 4y = 8 \\ \hline \end{array}$$

$$x = 26$$

$$3(26) - 4y = 18$$

$$\begin{array}{r} 78 - 4y = 18 \\ -78 \quad -78 \\ \hline \end{array}$$

$$\frac{-4y = -60}{-4} \quad \frac{-60}{-4}$$

$$y = 15$$

Solution: (26, 15)

Example 2: Solving Systems of Equations using multiplication first.

When 2 standard form equations cannot combine and eliminate. We can multiply
a number to all terms to create a zero pair.

$$5x + 6y = -8$$

$$-2(2x + 3y = -5)$$

$$5x + 6y = -8$$

$$-4x + 6y = 10$$

$$x = 2$$

$$5(2) + 6y = -8$$

$$10 + 6y = -8$$

$$-10 \quad -10$$

$$\frac{6y = -18}{6 \quad 6}$$

$$y = -3$$

Solution: (2, -3)

$$3(4x + 2y = 8)$$

$$-2(3x + 3y = 9)$$

$$12x + 6y = 24$$

$$+ -6x + 6y = -18$$

$$\frac{6x = 6}{6 \quad 6}$$

$$x = 1$$

$$4(1) + 2y = 8$$

$$4 + 2y = 8$$

$$-4 \quad -4$$

$$\frac{2y = 4}{2 \quad 2}$$

$$y = 2$$

Solution (1, 2)

The sum of 2 numbers is 22. The difference of the same 2 numbers is 12. What are the two numbers? (Write the 2 equations and solve)

$$\#1 = x$$

$$\#2 = y$$

$$\begin{array}{r} x + y = 22 \\ + \quad x - y = 12 \\ \hline \end{array}$$

$$\frac{2x = 34}{2 \quad 2}$$

$$x = 17$$

$$\begin{array}{r} 17 + y = 22 \\ -17 \quad -17 \\ \hline y = 5 \end{array}$$

Two #'s are
17 and 5

Find 2 numbers with a sum of 41 and a difference of 9. (write equations and solve)

$$\#1 = x$$

$$\#2 = y$$

$$\begin{array}{r} x + y = 41 \\ + \quad x - y = 9 \\ \hline \end{array}$$

$$\frac{2x = 50}{2 \quad 2}$$

$$x = 25$$

$$\begin{array}{r} 25 + y = 41 \\ - 25 \quad - 25 \\ \hline y = 16 \end{array}$$

Two #'s are
25 & 16