

5.1**Solving Systems of Linear Equations by Graphing**

For use with Exploration 5.1

Learning Target: Understand how to solve systems of linear equations by graphing.

- Success Criteria:**
- I can graph a linear equation.
 - I can find the point where two lines intersect.
 - I can solve a system of linear equations by graphing.

1 EXPLORATION: Using a Graph to Solve a Problem

Work with a partner. You charge your headphones and your phone. The equations below represent the battery powers $p\%$ of the devices after x minutes of charging.

$$p = \frac{5}{3}x \quad \text{Headphones}$$

$$p = x + 25 \quad \text{Phone}$$

- a. You check the battery power of each device every 10 minutes. Complete the table. How do the device's battery powers compare?

x (minutes)	10	20	30	40	50	60
p (headphones)	$16\frac{2}{3}$	$33\frac{1}{3}$	50	$66\frac{2}{3}$	$83\frac{1}{3}$	100
p (phone)	35	45	55	65	75	85

$$p = \frac{5}{3}(10) = \frac{50}{3} = 16\frac{2}{3}$$

$$p = 10 + 25 = 35$$

- b. After how much time do the devices have the same battery power? What is the battery power at that time? Justify your answer.

Same battery power p , so we can set the 2 eqns. = to each other

$$\begin{aligned} \rightarrow \frac{5}{3}x &= x + 25 \\ -x & \quad -x \\ \hline \frac{5}{3}x - x &= 25 \\ \frac{2}{3}x &= 25 \cdot \frac{3}{2} \\ x &= 37\frac{1}{2} \text{ min} \end{aligned}$$

$$\begin{aligned} p &= x + 25 \\ p &= 37.5 + 25 \\ p &= 62.5\% \end{aligned}$$

5.1 Solving Systems of Linear Equations by Graphing (continued)

c. The solutions of a linear equation are all the points on its graph. How many solutions can two linear equations share? Explain your reasoning.

1 - The two graphs cross at one point (solution)
(no solution) 0 - The two graphs never cross (parallel lines)
infinite - The two graphs are identical (one line
solutions lies on top of the other)

d. Graph the battery power equations in the same coordinate plane. What do you notice?

on graph paper

The intersection point of the graphs is where the devices have the same battery power at the same time. (62.5% power at 37.5 min).

e. Use a graphing calculator to check your answers in part (b). Explain your method.



