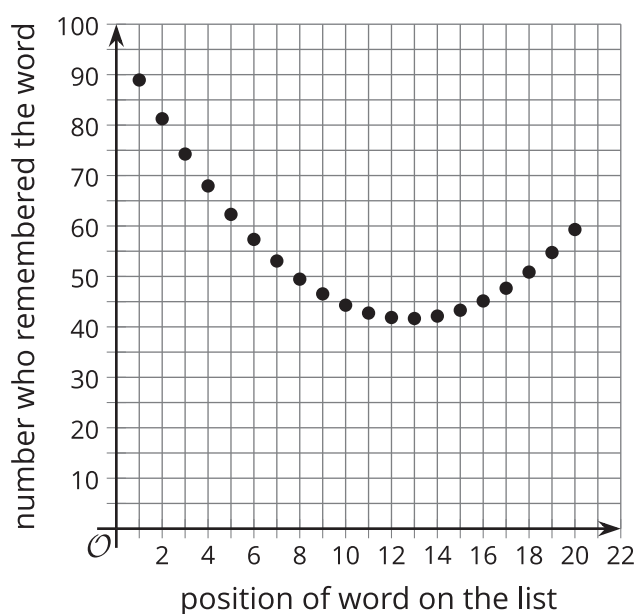


## Lesson 2: Equations and Graphs

- Let's explore solutions to equations

### 2.1: The Word List

A group is asked to memorize a list of 20 words, then recall as many as possible later. An equation that models the relationship between the position of the word on the list,  $n$ , and the number of people in the group who remembered the word,  $P$ , is  $P = 0.34n^2 - 8.7n + 97.3$ .



What do you notice? What do you wonder?

### 2.2: Seeing Solutions

1. A person is hiking from the top of a mountain into a valley. The function  $2,000 - 32t$  represents their elevation in feet above sea level,  $t$  minutes after they started their hike.
  - a. What does a solution to the equation  $2000 - 32t = 0$  mean?
  - b. Use technology to create a graph of  $y = 2,000 - 32t$ . Where do you see the solution to that equation on the graph?

2. A new electronic device originally costs \$1,000 but loses \$175 worth of value every year.
  - a. Write a function that represents the worth of the device after  $s$  years.
  
  - b. How many years until the device is worth \$0?
  
  - c. Use technology to graph the function. Where can you see the solution to your equation on the graph?

### 2.3: Understanding Solutions in Situations

1. The expression  $5.25 + 0.85x$  represents the amount a yogurt shop charges for yogurt with  $x$  ounces of toppings.
  - a. What does the equation  $5.25 + 0.85x = 7.08$  mean in this situation?
  
  - b. What would a solution to this equation mean?
  
  - c. Use technology to graph  $y = 5.25 + 0.85x$ . Where can you see the solution to the equation on the graph?
  
2. Drinks cost \$1.50, sandwiches cost \$4.00, and there is a flat delivery fee of \$5 for each delivery regardless of the number of orders.
  - a. Write an expression that represents the amount it costs to have  $x$  meals including a drink and a sandwich delivered to an office.
  
  - b. Write an equation that has a solution representing the number of drink and sandwich orders it would take to cost \$80.
  
  - c. Graph  $y = 1.5x + 4x + 5$ . Where can you see the solution to the equation on the graph?

3. The temperature in a deep freezer in a laboratory is  $-40$  degrees Celsius. The freezer breaks, so the temperature starts to rise by  $2.5$  degrees per hour.
- Use technology to graph  $y = -40 + 2.5x$ .
  - Explain how to use this graph to find the time (after breaking) when the freezer temperature reaches  $0$  degrees Celsius.
4. The expression  $400 - 10x^2$  represents the height in meters of an object above the ground  $x$  seconds after falling off a  $400$  meter building.
- Write an equation that has a solution that would give the time in seconds when the object hit the ground.
  - Use technology to graph  $y = 400 - 10x^2$  and explain where you can see the solution to your equation on the graph.