

Module 2: Developing Function Foundations

TOPIC 2: LINEAR RELATIONSHIPS

In this topic, students develop fluency with analyzing linear relationships, writing equations of lines, and graphing lines. Students use intuition and prior knowledge about writing equations, creating tables of values, and graphing equations to compare two linear relationships. Students determine the y -intercept of linear relationships from tables, two points, graphs, and contexts. Students graph lines presented in slope-intercept form.

Where have we been?

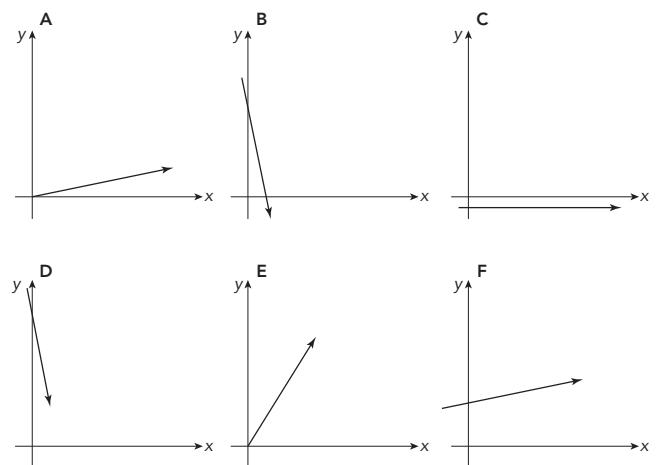
Students come into this topic with an understanding of slope as a unit rate of change and as a ratio of vertical change to horizontal change. They have experiences in representing proportional relationships with tables, graphs, and equations.

Where are we going?

This topic provides the foundation for students' algebraic fluency with determining and using equations of linear relationships. The skills developed in this topic will be used in the next two topics as students develop equations for linear functions, interpret those functions, and compare functions represented in different ways. Beyond grade 8, students should understand that different forms of an equation can shed light on a problem situation.

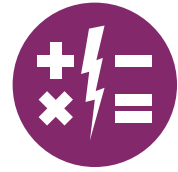
Using Numberless Graphs to Compare Linear Relationships

Numberless graphs are graphs that do not show x -axis or y -axis intervals or labels. These graphs are used to show the important information about linear relationships: the steepness of the graph, whether it increases or decreases from left to right, and whether it goes through the origin or not.



Myth: Students only use 10% of their brains.

Hollywood is in love with the idea that humans only use a small portion of their brains. This notion formed the basis of the movies *Lucy* (2014) and *Limitless* (2011). Both films ask the audience: *Imagine what you could accomplish if you could use 100% of your brain!*



Well, this isn't Hollywood, and you're stuck with an ordinary brain. The good news is that you **do** use 100% of your brain. As you look around the room, your *visual cortex* is busy assembling images, your *motor cortex* is busy moving your neck, and all of the *associative areas* recognize the objects that you see. Meanwhile, the *corpus callosum*, which is a thick band of neurons that connect the two hemispheres, ensures that all of this information is kept coordinated. Moreover, the brain does this automatically, which frees up space to ponder deep, abstract concepts...like mathematics!

#mathmythbusted

Talking Points

You can further support your student's learning by asking questions about the work they do in class or at home. Your student is learning to think about linear relationships as objects that can be analyzed, graphed, and compared.

Questions to Ask

- How does this problem look like something you did in class?
- Can you show me the strategy you used to solve this problem? Do you know another way to solve it?
- Does your answer make sense? How do you know?
- Is there anything you don't understand? How can you use today's lesson to help?

Key Terms

first differences

First differences are the values determined by subtracting consecutive y -values in a table when the x -values are consecutive integers.

y -intercept

The y -intercept is the y -coordinate of the point where a graph crosses the y -axis.

slope-intercept form

The slope-intercept form of a linear equation is $y = mx + b$, where m is the slope of the line and $(0, b)$ is the y -intercept.