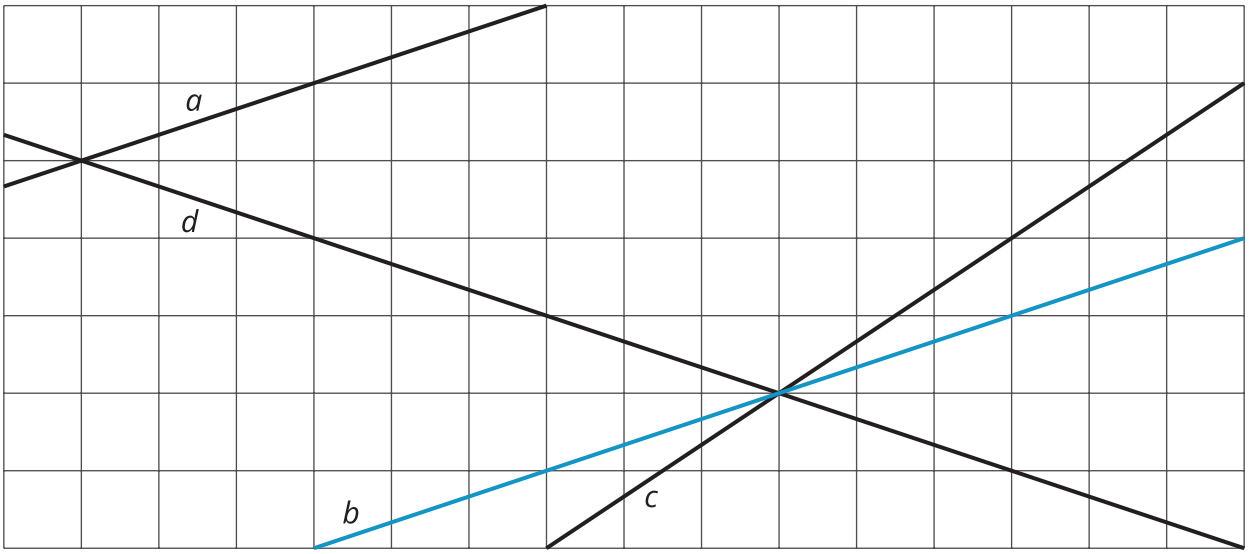
Slopes Don't Have to Be Positive

Let's find out what a negative slope means.

9.1 Which Three Go Together: Intersecting Lines

Which three go together? Why do they go together?

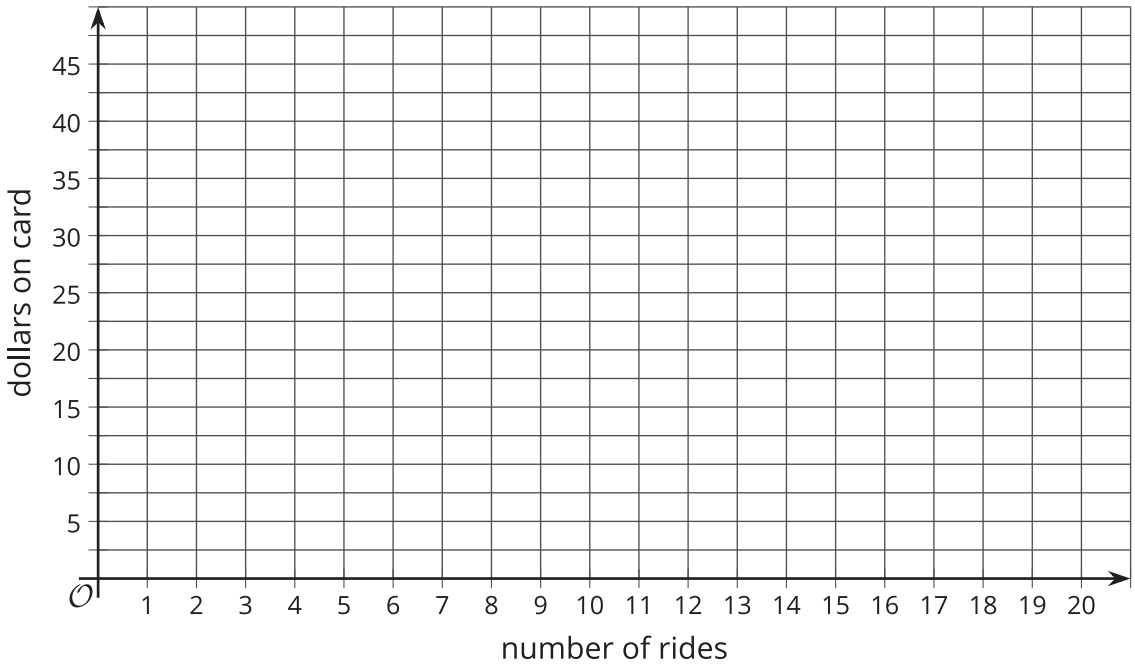


9.2 Stand Clear of the Closing Doors, Please

Noah has $40 on his fare card. Every time he rides public transportation, $2.50 is subtracted from the amount available on his card.

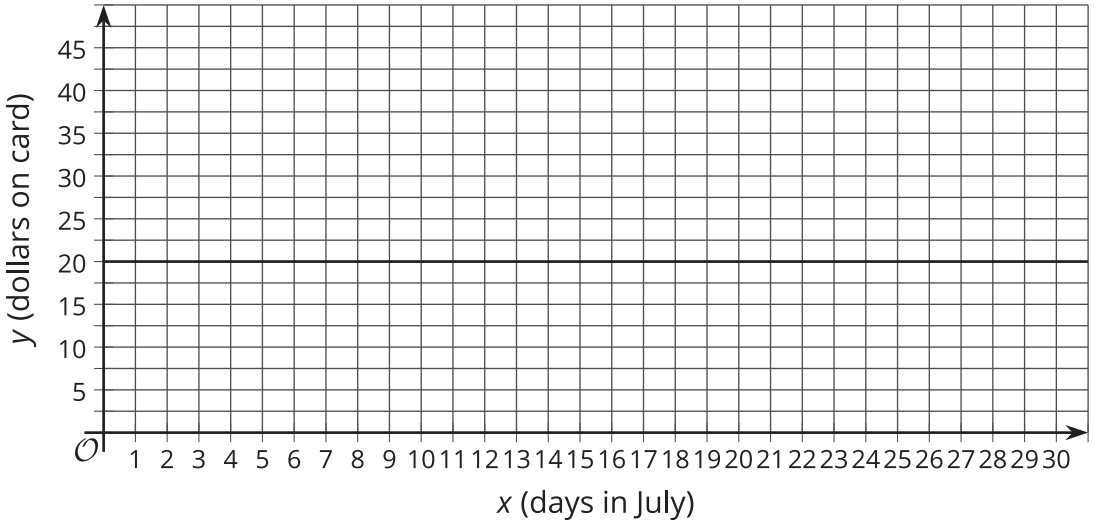
1. How much money, in dollars, is available on his card after he takes
   a. 0 rides?
   b. 1 ride?
   c. 2 rides?
   d. x rides?
2. How many rides can Noah take before the card runs out of money? Where would you see this number of rides on a graph?

3. Graph the relationship between amount of money on the card and number of rides.



9.3 Travel Habits in July

This graph shows the amount of money in dollars that is on Han's fare card for every day of last July.



1. Describe what happened with the money on Han's fare card in July.

2. Plot and label 3 different points on the line.
3. Write an equation where x represents the day in July and y represents the dollars on the card.

4. What value makes sense for the slope of the line that represents the money on Han's fare card in July?

Are you ready for more?

A loan was taken out and is being paid back in multiple payments. Which of the following situations would have a graph with a positive slope and which would have a negative slope? Explain your reasoning.

1. Amount paid on the vertical axis and time since payments started on the horizontal axis.

2. Amount owed on the vertical axis and time remaining until the loan is paid off on the horizontal axis.

3. Amount paid on the vertical axis and time remaining until the loan is paid off on the horizontal axis.

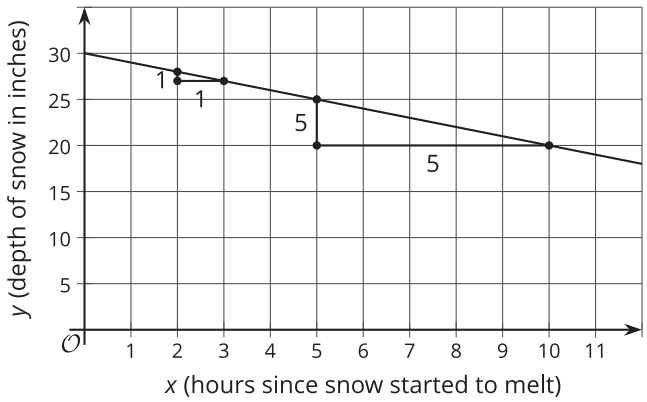
CC BY NC Illustrative Mathematics, based on IM 6–8 Math, CC BY Open Up Resources.

Lesson 9 Summary

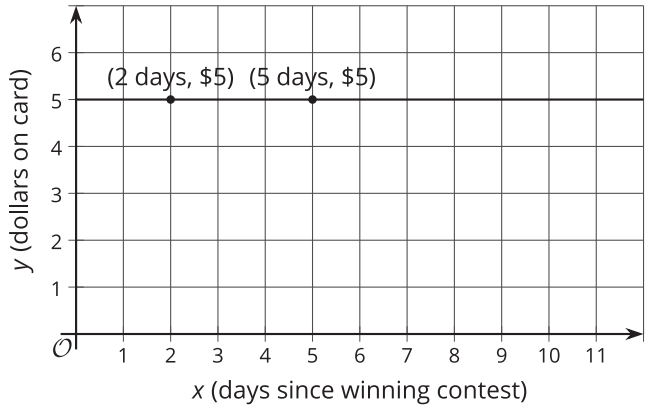
At the end of winter in Maine, the snow on the ground was 30 inches deep. Then there was a particularly warm day and the snow melted at the rate of 1 inch per hour. The graph shows the relationship between the time since the snow started to melt and the depth of the remaining snow.

Graphs with a negative slope often describe situations where some quantity is decreasing over time.

Since the depth of the snow decreases by 1 inch per hour, the rate of change is -1 inch per hour and the slope of this graph is -1. The vertical intercept is 30 since the snow was 30 inches high before it started to melt.



Graphs with a slope of 0 describe situations where there is no change in the y-value even though the x-value is changing.



For example, Elena wins a prize that gives her free bus rides for a year. Her fare card already had $5 on it when she won the prize. Here is a graph of the amount of money on her fare card after winning the prize. Since she doesn't need to add or use money from her fare card for the next year, the amount on her fare card will not change. The rate of change is 0 dollars per day and the slope of this graph is 0. All graphs of linear relationships with slopes of 0 are horizontal.