LESSON MAKER PRO

Slope Connections

Find rates of change, then compare lines.

HIGH SCHOOL · FA.F.15

FA.F.15 "Determine the rate of change of a linear function from a description of a relationship or from two (x, y) values, including reading these from a table or from a graph. (8.F.4) Use the rate of change to determine if two lines are parallel..."

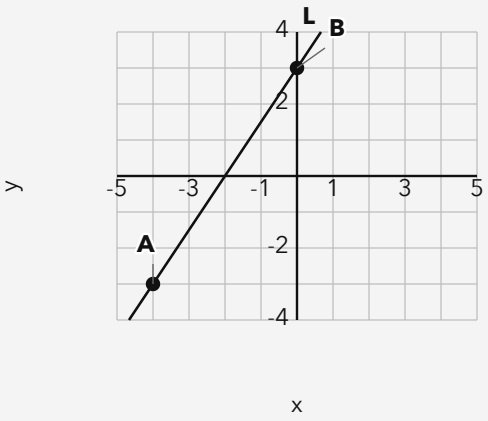
NAME _____ DATE _____

THE BIG IDEA

To find a line's rate of change, divide the change in y by the change in x. Lines with equal slopes are parallel, and lines with slopes whose product is -1 are perpendicular.

WORKED EXAMPLE

Find the rate of change of line L using points A and B on the graph.

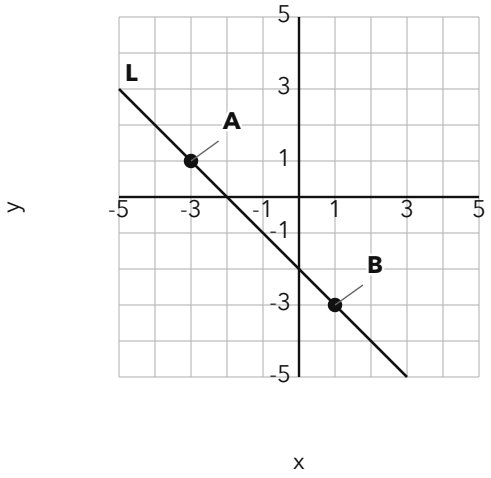


1. Read the points: A is (-4, -3) and B is (0, 3).
2. Find the changes: 3 - (-3) = 6 and 0 - (-4) = 4.
3. Divide the change in y by the change in x: 6/4 = 3/2.

Answer: The rate of change is 3/2.

PRACTICE 6 problems

1 Use the marked points to find the rate of change of line L.



ANSWER _____

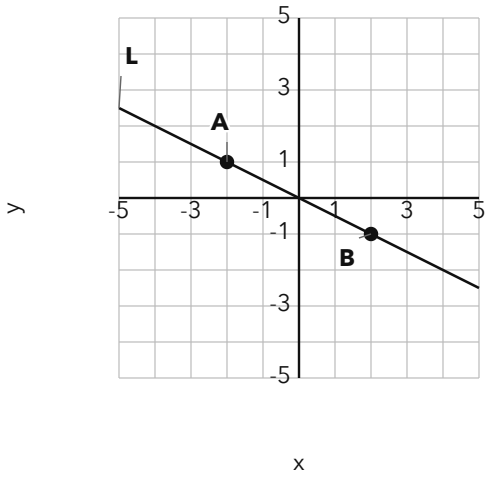
2 Find the rate of change of the linear function in the table.

LINEAR FUNCTION

x	y
-1	5
0	3
2	-1

ANSWER _____

3 Is line L perpendicular, parallel, or neither to y = 2x + 5? Find the slope of L to support your answer.



ANSWER _____

4 A line passes through (0, 1) and (4, 4). Another passes through (0, -2) and (3, -6). Are the lines parallel, perpendicular, or neither?

ANSWER _____

5 A music app downloads 24 songs in 6 minutes at a constant rate. Find the rate in songs per minute.

ANSWER _____

6 Are y = -3x + 2 and y = -3x - 5 parallel, perpendicular, or neither?

ANSWER _____

APPLY IT Show your work

1 Two concert ticket plans have a fixed fee plus a cost per ticket. Plan A costs $34 for 2 tickets and $64 for 5 tickets. Plan B costs $18 for 1 ticket and $48 for 4 tickets. If you graph total cost against number of tickets, are the lines parallel, perpendicular, or neither?

WORK SPACE

ANSWER _____

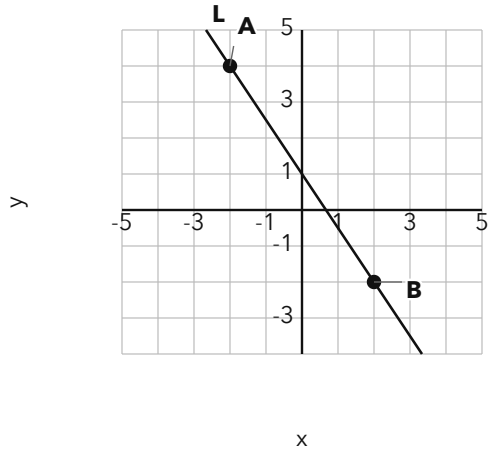
2 In a video game map, each coordinate marks a location in blocks. A straight path passes through (-2, 3) and (2, 1). Another straight path passes through (0, -1) and (2, 3). If both paths continue, do their lines meet at a right angle?

WORK SPACE

ANSWER _____

CHALLENGE One step up

Find x so the line through (1, 4) and (x, 10) is parallel to line L. Show how you found x.



WORK SPACE AND ANSWER

ANSWER KEY

Slope Connections

HIGH SCHOOL · FA.F.15

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	Use the marked points to find the rate of change of line L.	**-1**
2	Find the rate of change of the linear function in the table.	**-2**
3	Is line L perpendicular, parallel, or neither to y = 2x + 5? Find the slope of L to support your answer.	**The slope of L is -1/2. The lines are perpendicular.**
4	A line passes through (0, 1) and (4, 4). Another passes through (0, -2) and (3, -6). Are the lines parallel, perpendicular, or neither?	**Perpendicular. Their slopes are 3/4 and -4/3.**
5	A music app downloads 24 songs in 6 minutes at a constant rate. Find the rate in songs per minute.	**4 songs per minute**
6	Are y = -3x + 2 and y = -3x - 5 parallel, perpendicular, or neither?	**Parallel**

PART 2 · APPLY IT

1. **Parallel** Plan A's rate is (64 - 34)/(5 - 2) = $10 per ticket. Plan B's rate is (48 - 18)/(4 - 1) = $10 per ticket, so the lines are parallel.
2. **Yes, the lines are perpendicular.** The slopes are (1 - 3)/(2 - (-2)) = -1/2 and (3 - (-1))/(2 - 0) = 2. Their product is -1, so the lines meet at a right angle.

CHALLENGE

Line L has slope (-2 - 4)/(2 - (-2)) = -3/2. For the other line to be parallel, 6/(x - 1) = -3/2, so x = -3.

Accept equivalent fractions and calculations that use the points in reverse order. For the word problems, accept a correct classification supported by both rates.