LESSON MAKER PRO

Lines on the Move

Predict what changes when a line's equation changes.

GRADE 8 · PA.A.2.4

PA.A.2.4 "Predict the effect on the graph of a linear function when the slope or y-intercept changes. Use appropriate tools to examine these effects."

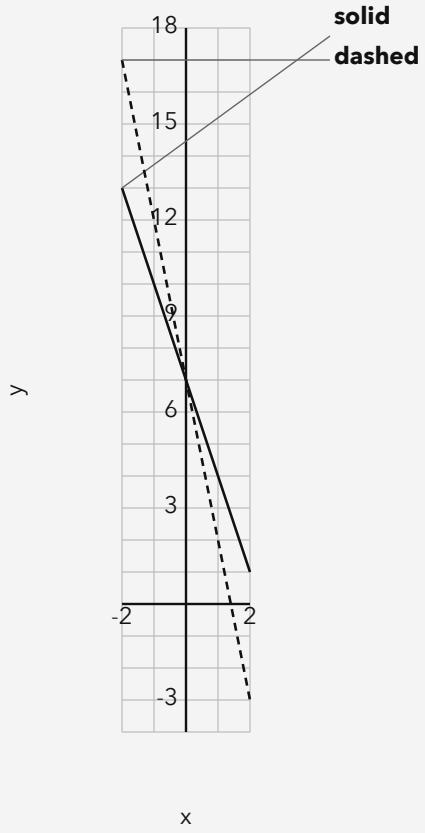
NAME _____ DATE _____

SLOPE AND STARTING POINT

In y = mx + b, m is the slope and b is the y-intercept. Changing the slope changes how quickly a line rises or falls. Changing only the y-intercept moves the line up or down without changing its steepness.

WORKED EXAMPLE

Compare the solid line with the dashed line. What changes about the graph?

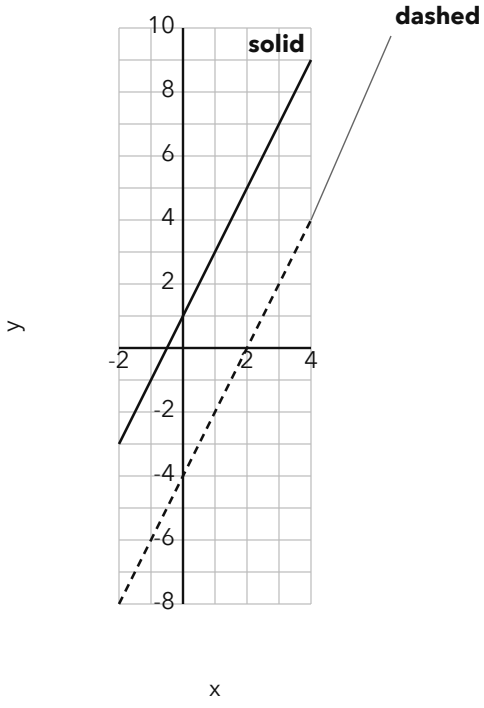


1. Read the slopes: solid is -3, and dashed is -5.
2. Both lines cross the y-axis at (0, 7).
3. Since the dashed line has the more negative slope, it falls faster as x increases.

Answer: The dashed line falls faster. Both lines have the same y-intercept, 7.

PRACTICE 6 problems

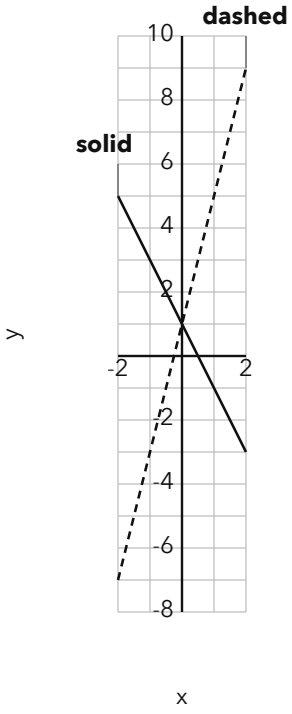
1 Compare the solid line with the dashed line. What stayed the same, and how did the y-intercept change?



ANSWER _____

_____

2 Compare the solid line with the dashed line. How did the slope change, and what happened to the y-intercept?



ANSWER _____

_____

3 The line y = 4x - 2 changes to y = 4x + 6. How does its graph move? Does its steepness change?

ANSWER _____

_____

4 The line y = -x + 2 changes to y = -4x + 2. Does the new line fall faster or slower as x increases? Give the point both lines share.

ANSWER _____

_____

5 A line has slope 0 and y-intercept -2. Its y-intercept changes to 4, but its slope stays 0. At what point does the new line cross the y-axis?

ANSWER _____

6 The line y = -4x + 6 moves down 8 units. Write the equation of the new line.

ANSWER _____

APPLY IT Show your work

1 A game pass costs $2 to join plus $4 per month. A new offer costs $6 to join plus $4 per month. Let x be months and y be total cost. How does the new cost graph compare with the old one? How much more does the new offer cost after 8 months?

WORK SPACE

ANSWER _____

2 You have $8 saved for a concert ticket and add $2 each week. You change your plan to add $4 each week, starting with the same $8. Let x be weeks and y be total savings. How do the slope and y-intercept change? How much more will you have after 6 weeks?

WORK SPACE

ANSWER _____

CHALLENGE One step up

A line changes from y = 2x + 4 to y = -x + 10. Find where the two lines cross. For x-values greater than the crossing point's x-value, which line is higher? Explain.

WORK SPACE AND ANSWER

ANSWER KEY

Lines on the Move

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PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	Compare the solid line with the dashed line. What stayed the same, and how did the y-intercept change?	**The slope stayed 2, so the lines are parallel. The y-intercept decreased from 1 to -4, moving the line down 5 units.**
2	Compare the solid line with the dashed line. How did the slope change, and what happened to the y-intercept?	**The slope changed from -2 to 4, so the line changed from falling to rising. The y-intercept stayed 1.**
3	The line y = 4x - 2 changes to y = 4x + 6. How does its graph move? Does its steepness change?	**It moves up 8 units. Its steepness does not change because the slope stays 4.**
4	The line y = -x + 2 changes to y = -4x + 2. Does the new line fall faster or slower as x increases? Give the point both lines share.	**The new line falls faster. Both lines pass through (0, 2).**
5	A line has slope 0 and y-intercept -2. Its y-intercept changes to 4, but its slope stays 0. At what point does the new line cross the y-axis?	**(0, 4)**
6	The line y = -4x + 6 moves down 8 units. Write the equation of the new line.	**y = -4x - 2**

PART 2 · APPLY IT

1. **The new graph is 4 units higher and has the same slope. The new offer costs $4 more after 8 months.** Both plans cost $4 per month, so their graphs have the same slope. The joining fee rises from $2 to $6, a difference of $4 at every month.
2. **The slope increases from 2 to 4, and the y-intercept stays 8. After 6 weeks, you will have $12 more.** Both plans start at $8. The new plan adds $2 more each week, so after 6 weeks it adds 6 × $2 = $12 more.

CHALLENGE

They cross at (2, 8), since 2x + 4 = -x + 10 gives x = 2. For x > 2, y = 2x + 4 is higher because it rises while y = -x + 10 falls.

Accept equivalent descriptions of a line moving up or down. In graph comparisons, students should distinguish a change in slope from a change in y-intercept.