LESSON MAKER PRO

Lines Tell Stories

Find what a line says about change and starting values.

HIGH SCHOOL · A1.A.4

A1.A.4 "Analyze real-world and mathematical problems involving linear equations. Analyze, use, and apply mathematical models and other data sets (e.g., graphs, equations, two points..."

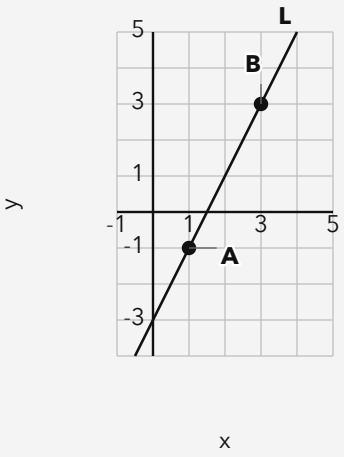
NAME _____ DATE _____

SLOPE AND STARTING VALUE

To find a line's slope from two points, divide the change in y by the change in x. Substitute the slope and one point into y = mx + b to find b, the y-intercept's y-value.

WORKED EXAMPLE

Use the graph to find the slope and y-intercept of line L. Then write its equation.

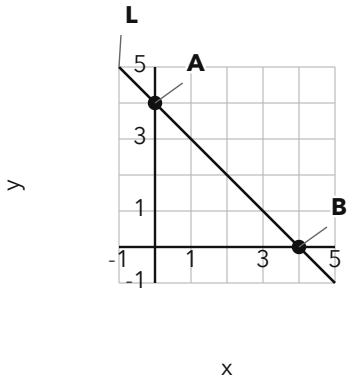


1. Read the points from the graph: A(1, -1) and B(3, 3).
2. Slope = (3 - (-1))/(3 - 1) = 4/2 = 2.
3. Use A to find b: -1 = 2(1) + b, so b = -3.
4. The y-intercept is (0, -3), and the equation is y = 2x - 3.

Answer: Slope: 2; y-intercept: (0, -3); equation: y = 2x - 3.

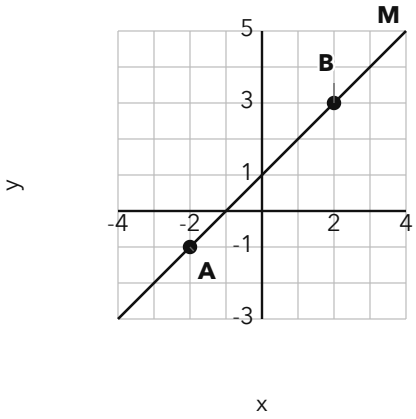
PRACTICE 6 problems

1 Use the graph to find the slope and x-intercept of line L.



ANSWER _____

2 Use the graph to find the slope and y-intercept of line M.



ANSWER _____

3 Write the equation in slope-intercept form for the line through (1, 4) and (3, 10).

ANSWER _____

4 A line has slope -2 and passes through (3, 1). Write its equation in slope-intercept form.

ANSWER _____

5 Find the x-intercept and y-intercept of 3x + 2y = 12.

ANSWER _____

6 Use the table to write an equation for y in terms of x.

VALUES ON A LINE

x	y
-1	5
0	2
1	-1
2	-4

ANSWER _____

APPLY IT Show your work

1 A music plan charges a starting fee plus the same price for each download. Four downloads cost $14 total, and eight downloads cost $20 total. Let C be the total cost in dollars for x downloads. Write an equation for C, and state what its slope and y-intercept mean.

WORK SPACE

ANSWER _____

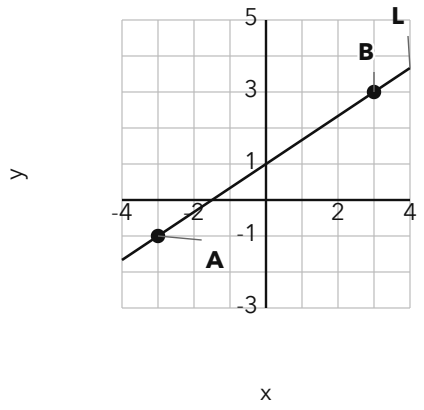
2 A dance club spends $120 on decorations and sells tickets for $6 each, with no other costs. Let P be the club's profit in dollars after selling x tickets. Write an equation for P, find how many tickets the club must sell to break even, and explain the y-intercept.

WORK SPACE

ANSWER _____

CHALLENGE One step up

Write an equation for the line that is perpendicular to line L on the graph and passes through (0, 4). Explain how you found its slope.



WORK SPACE AND ANSWER

ANSWER KEY

Lines Tell Stories

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PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	Use the graph to find the slope and x-intercept of line L.	**Slope: -1; x-intercept: (4, 0).**
2	Use the graph to find the slope and y-intercept of line M.	**Slope: 1; y-intercept: (0, 1).**
3	Write the equation in slope-intercept form for the line through (1, 4) and (3, 10).	**y = 3x + 1**
4	A line has slope -2 and passes through (3, 1). Write its equation in slope-intercept form.	**y = -2x + 7**
5	Find the x-intercept and y-intercept of 3x + 2y = 12.	**x-intercept: (4, 0); y-intercept: (0, 6).**
6	Use the table to write an equation for y in terms of x.	**y = -3x + 2**

PART 2 · APPLY IT

1. **C = (3/2)x + 8. The slope means each download costs $1.50. The y-intercept (0, 8) means the starting fee is $8.** The cost rises $6 over 4 downloads, so the slope is $6/4 = $1.50 per download. Substitute x = 4 and C = 14 to get 14 = 1.5(4) + b, so b = 8.
2. **P = 6x - 120. The club breaks even after selling 20 tickets. The y-intercept (0, -120) means the club is $120 in debt before selling any tickets.** Profit is ticket revenue minus the $120 cost. Set 6x - 120 = 0 to find the break-even point, x = 20.

CHALLENGE

Line L has slope (3 - (-1))/(3 - (-3)) = 4/6 = 2/3. A perpendicular line has the negative reciprocal slope, -3/2. Since it passes through (0, 4), its equation is y = (-3/2)x + 4.

Accept equivalent equations when an equation form is not specified. For intercepts, require ordered pairs or a clearly identified x-value or y-value.