LESSON MAKER PRO

Lines in Many Forms

Build a linear model, then change its form.

HIGH SCHOOL · FA.F.18

FA.F.18 "Given two points, a graph, a table of values, a mapping diagram, or a real-world context, determine the linear function that models this information. Fluently convert between the point-slope, slope-intercept, and standard form of a line."

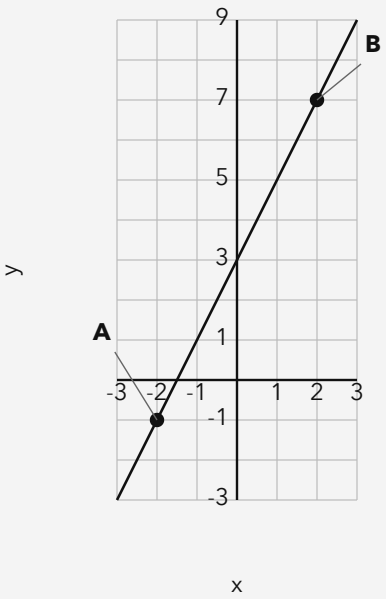
NAME _____ DATE _____

FROM POINTS TO EQUATIONS

A linear function has a constant rate of change. Find the slope with (change in y)/(change in x), then use a point to write an equation. You can rearrange the equation into slope-intercept form, y = mx + b, or standard form, Ax + By = C.

WORKED EXAMPLE

Find the slope-intercept equation of the line through A and B on the graph.

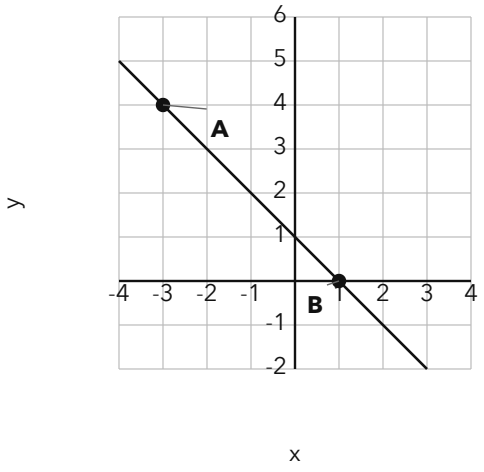


1. Find the slope: m = (7 - (-1))/(2 - (-2)) = 8/4 = 2.
2. Substitute A into y = 2x + b: -1 = 2(-2) + b.
3. Solve for b: b = 3.

Answer: y = 2x + 3

PRACTICE 6 problems

1 Find the slope-intercept equation of the line through A and B on the graph.



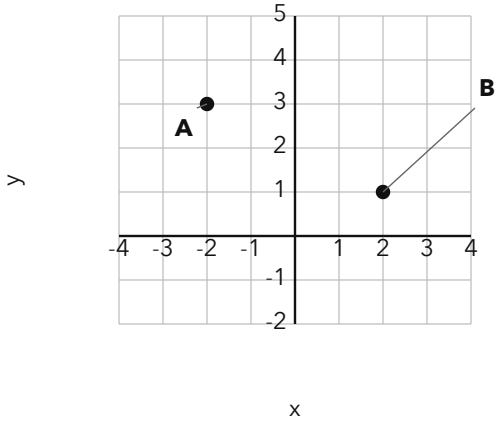
ANSWER _____

2 Use the table to write y as a linear function of x in slope-intercept form.

x	y
-2	11
0	5
2	-1
4	-7

ANSWER _____

3 Write the equation of the line through A and B on the graph in standard form, with a positive x coefficient.



ANSWER _____

4 Write the line through (4, -3) and (8, 9) in point-slope form using (4, -3).

ANSWER _____

5 Convert y - 4 = -2(x + 1) to slope-intercept form.

ANSWER _____

6 Convert 3x - 4y = 12 to slope-intercept form.

ANSWER _____

APPLY IT Show your work

1 A print shop charges a setup fee plus a fixed price per custom sticker. An order of 6 stickers costs $42, and an order of 12 costs $66. Write a function C(n) for the cost of n stickers. Then find the cost of 15 stickers.

WORK SPACE

ANSWER _____

2 A phone has 80% battery charge after 1 hour of use and 65% after 4 hours. Assume the charge decreases at a constant rate. Write a function P(t) for the percent charge after t hours of use. After how many hours will the charge reach 20%?

WORK SPACE

ANSWER _____

CHALLENGE One step up

A line passes through (-4, 7) and (2, -5). Write its equation in point-slope form using (-4, 7), in slope-intercept form, and in standard form with a positive x coefficient. Show how you found the slope.

WORK SPACE AND ANSWER

Lines in Many Forms

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	Find the slope-intercept equation of the line through A and B on the graph.	**y = -x + 1**
2	Use the table to write y as a linear function of x in slope-intercept form.	**y = -3x + 5**
3	Write the equation of the line through A and B on the graph in standard form, with a positive x coefficient.	**x + 2y = 4**
4	Write the line through (4, -3) and (8, 9) in point-slope form using (4, -3).	**y + 3 = 3(x - 4)**
5	Convert y - 4 = -2(x + 1) to slope-intercept form.	**y = -2x + 2**
6	Convert 3x - 4y = 12 to slope-intercept form.	**y = (3/4)x - 3**

PART 2 · APPLY IT

1. **C(n) = 4n + 18; C(15) = $78** The price per sticker is (66 - 42)/(12 - 6) = $4. Substituting n = 6 gives a setup fee of $18, so C(15) = 4(15) + 18 = $78.
2. **P(t) = 85 - 5t; 13 hours** The charge changes by (65 - 80)/(4 - 1) = -5 percentage points per hour. Using P(1) = 80 gives P(t) = 85 - 5t, and solving 20 = 85 - 5t gives t = 13.

CHALLENGE

m = (-5 - 7)/(2 - (-4)) = -12/6 = -2. Point-slope: y - 7 = -2(x + 4). Slope-intercept: y = -2x - 1. Standard: 2x + y = -1.

Accept equivalent equations where the prompt does not require a specific form or point. For standard form, require integer coefficients and a positive x coefficient as directed.