

Slope Signal

Read the clues in every linear function.

GRADE 8 • 8.PFA.3.b

8.PFA.3.b "Describe key characteristics of linear functions including slope (m), y -intercept (b), and independent and dependent variables."

NAME _____

DATE _____

THE BIG IDEA

A linear function can be written as $y = mx + b$. The slope, m , tells how y changes when x changes, and the y -intercept, b , is the value of y when $x = 0$. The independent variable is the input, and the dependent variable changes because of that input.

WORKED EXAMPLE

For $y = 7x - 11$, identify m and b .
Then find y when $x = 2$.

1. $m = 7$ and $b = -11$.
2. Substitute 2 for x : $y = 7(2) - 11$.
3. Multiply and subtract: $y = 14 - 11 = 3$.

Answer: $m = 7$, $b = -11$, and $y = 3$

PRACTICE 6 problems

- 1** For $y = 5x - 9$, identify the slope, y -intercept, independent variable, and dependent variable.

ANSWER _____

- 2** A table shows a linear function. x : -5, 0, 5 y : 9, 4, -1 Identify the slope and y -intercept.

ANSWER _____

- 3** The equation $C = 12d + 15$ gives the total cost, C , for d days. Identify the slope, y -intercept, independent variable, and dependent variable.

ANSWER _____

- 4** A line has a slope of -4 and a y -intercept of 13. Write its equation in $y = mx + b$ form.

ANSWER _____

- 5** For $y = \frac{1}{5}x + 6$, name the independent and dependent variables. Then find y when $x = 40$.

ANSWER _____

- 6** A line crosses the y -axis at -1. It rises 16 units when x moves 4 units to the right. Write the equation of the line.

ANSWER _____

APPLY IT Show your work

- 1** A gaming club charges a \$16 sign-up fee and \$5 for each month of membership. Let x be the number of months and C be the total cost. Write an equation for C , identify the slope and y -intercept, name the independent and dependent variables, and find the cost after 6 months.

WORK SPACE

ANSWER _____

- 2** A student earns \$18 for starting a video-editing project and \$14 for each clip edited. Let x be the number of clips and P be the total pay. Write an equation for P , identify the slope and y -intercept, name the independent and dependent variables, and find the pay for 5 clips.

WORK SPACE

ANSWER _____

CHALLENGE One step up

CHALLENGE

A skate shop offers two scooter-rental plans. Let x be rental hours and y be total cost in dollars. Plan A: $y = 8x + 16$ Plan B: $y = 8x + 40$ Do the plans ever have the same cost for the same number of hours? Explain using slope and y -intercept. Also name the independent and dependent variables.

PART 1 • PRACTICE

#	PROBLEM	ANSWER
1	For $y = 5x - 9$, identify the slope, y-intercept, independent variable, and dependent variable.	Slope: 5; y-intercept: -9; independent variable: x; dependent variable: y
2	A table shows a linear function. x : -5, 0, 5 y : 9, 4, -1 Identify the slope and y-intercept.	Slope: -1; y-intercept: 4
3	The equation $C = 12d + 15$ gives the total cost, C , for d days. Identify the slope, y-intercept, independent variable, and dependent variable.	Slope: 12; y-intercept: 15; independent variable: d; dependent variable: C
4	A line has a slope of -4 and a y-intercept of 13. Write its equation in $y = mx + b$ form.	$y = -4x + 13$
5	For $y = 1/5x + 6$, name the independent and dependent variables. Then find y when $x = 40$.	Independent variable: x; dependent variable: y; $y = 14$
6	A line crosses the y-axis at -1. It rises 16 units when x moves 4 units to the right. Write the equation of the line.	$y = 4x - 1$

PART 2 • APPLY IT

- $C = 5x + 16$; slope: 5 dollars per month; y-intercept: \$16; independent variable: x , months; dependent variable: C , total cost; cost after 6 months: \$46** The sign-up fee is the starting cost, so it is the y-intercept. Multiply 5 by 6 and add 16 to find the total.
- $P = 14x + 18$; slope: 14 dollars per clip; y-intercept: \$18; independent variable: x , clips; dependent variable: P , total pay; pay for 5 clips: \$88** The amount earned for each clip is the slope, and the starting payment is the y-intercept. Substitute 5 for x in $P = 14x + 18$.

CHALLENGE

No. Both plans have a slope of 8, so their costs increase at the same rate. Their y-intercepts are different, 16 for Plan A and 40 for Plan B, so the plans never have the same cost for the same x -value. The independent variable is x , rental hours, and the dependent variable is y , total cost.

Accept equivalent equation forms, such as $y + 1 = 4x$ for problem 6. Students may describe slope and y-intercept in words if the values and variables are correct.