

Slope to Start

Write and check equations from graphs, tables and contexts

GRADE 8 • 8.PFA.3.e

8.PFA.3.e "Write an equation of a linear function in the form $y = mx + b$, given a graph, table, or a situation in context."

NAME _____

DATE _____

BUILD UNDERSTANDING

Find $m = \text{change in } y / \text{change in } x$, then use $y = mx + b$ to find b . A listed y -value is b only when $x = 0$. On graphs read the scale before finding rise and run. Show calculations and write each equation in slope-intercept form.

WORKED EXAMPLE

Write an equation for the linear function in this table.

WORKED FUNCTION

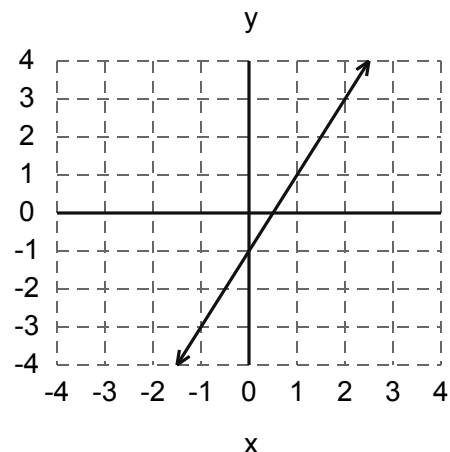
x	y
0	-2
1	1
2	4

1. The y -value rises 3 per 1 in x , so $m = 3$.
2. At $x = 0$, $y = -2$, so $b = -2$.

Answer: $y = 3x - 2$.

PRACTICE 4 problems

- 1 Write $y = mx + b$ for the graphed line. State m and b , then choose another clear lattice point on the line and check it in your equation.

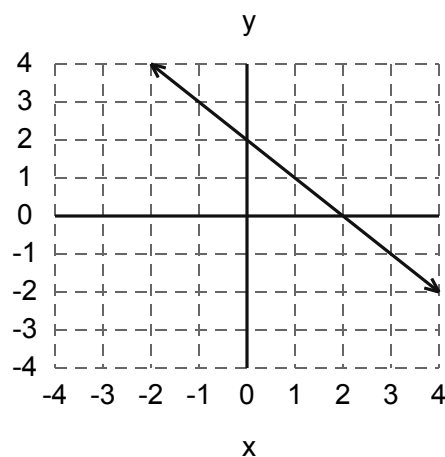


- 2 Write the equation of this linear function. Show how skipped x-values affect your slope calculation.

FUNCTION TABLE

x	y
-2	5
2	-1
4	-4

- 3 Write $y = mx + b$ from this graph. Explain how you found b.



- 4 Write an equation for this linear function even though $x = 0$ is not in the table. Verify it with a listed pair.

FUNCTION TABLE

x	y
2	-1
4	0
6	1

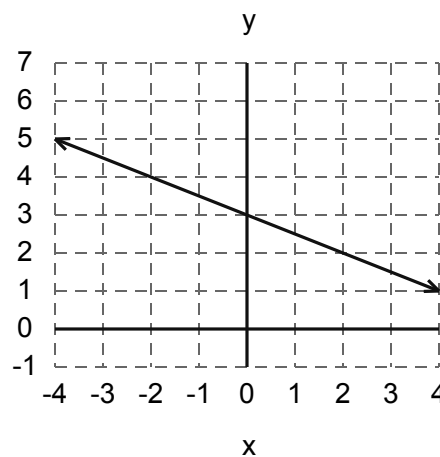
APPLY IT Show your work

- 1** A bicycle rental costs \$4 to unlock and \$3 per hour. Let x be hours and y be dollars. Write $y = mx + b$ and explain both constants.

- 2** A tank starts with 18 liters and loses 2 liters per minute. Let x be minutes and y be liters. Write its equation and state the time interval from the start through the moment it becomes empty.

CHALLENGE One step up

A student writes $y = -2x + 3$ for this line. Write the correct equation and use two graph features to explain the error.



Require equations derived from actual graphs, tables and contexts. Accept equivalent fraction notation and checks using any shown pair. Graphs use one-unit ticks. In the challenge the student kept the correct intercept but used the reciprocal slope magnitude.

PRACTICE 1

$y = 2x - 1$; $m = 2$; $b = -1$. Check (2, 3): $3 = 2(2) - 1$.

PRACTICE 2

$m = (-1 - 5)/(2 - (-2)) = -6/4 = -3/2$; $b = 2$; $y = -(3/2)x + 2$.

PRACTICE 3

$y = -x + 2$; the line crosses the y -axis at (0, 2), so $b = 2$.

PRACTICE 4

$m = 1/2$; $b = -2$; $y = (1/2)x - 2$. Check: $(1/2)(6) - 2 = 1$.

APPLY IT 1

$y = 3x + 4$; $m = 3$ dollars per hour; $b = 4$ dollars.
At zero hours the fee is \$4; each additional hour adds \$3.

APPLY IT 2

$y = -2x + 18$; $0 \leq x \leq 9$ minutes.
The rate is -2 liters per minute. Setting $y = 0$ gives $x = 9$.

CHALLENGE

$y = -(1/2)x + 3$. The intercept 3 is correct; a run of 2 has a fall of 1, not 4.