

Line Clues

Read equations, find graph features, and model real situations.

GRADE 8 • 8.FGR.5.9

8.FGR.5.9 "Graph and analyze linear functions expressed in various algebraic forms and show key characteristics of the graph to describe applicable situations."

NAME _____

DATE _____

READ THE LINE

In $y = mx + b$, m is the slope and b is the y-intercept. The slope tells how much y changes when x increases by 1, and the y-intercept tells where the line crosses the y-axis. Rewrite equations into $y = mx + b$ form when needed so you can see these features.

WORKED EXAMPLE

Analyze $y = 9x + 14$.

1. Compare the equation to $y = mx + b$.
2. The slope is 9, so the line rises 9 units for every 1 unit to the right.
3. The y-intercept is 14, so the line crosses the y-axis at 14.

Answer: Slope: 9. y-intercept: 14. The line rises from left to right.

PRACTICE 6 problems

- 1** For $y = 4x - 6$, state the slope and y-intercept.

ANSWER _____

- 2** Rewrite $3x + y = 12$ in $y = mx + b$ form. Then state the slope and y-intercept.

ANSWER _____

- 3** Rewrite $y + 2 = -4(x - 6)$ in $y = mx + b$ form. Then state the slope and y-intercept.

ANSWER _____

- 4** A line has slope 2 and passes through (4, -3). Write its equation in $y = mx + b$ form.

ANSWER _____

- 5** For $y = 6x - 24$, find the x-intercept and the y-intercept.

ANSWER _____

- 6** A line passes through (0, -4) and (2, 2). Write its equation in $y = mx + b$ form. State whether the graph rises or falls from left to right.

ANSWER _____

APPLY IT Show your work

- 1** A scooter rental app charges a \$3 unlock fee and \$2 for each minute of riding. Let x be the number of minutes and y be the total cost in dollars. Write an equation for the situation, state the slope and y -intercept, and find the cost of an 8-minute ride.

WORK SPACE

ANSWER _____

- 2** A video channel has 12 subscribers on day zero and gains 4 subscribers each day. Let x be the number of days and y be the number of subscribers. Write an equation, describe whether its graph rises or falls, and find the number of subscribers after 6 days.

WORK SPACE

ANSWER _____

CHALLENGE One step up

CHALLENGE

Line A is $y = -2x + 16$. Line B is $y = 3x - 4$. Find the point where the lines intersect. Explain what the intersection means for the two functions.

PART 1 • PRACTICE

#	PROBLEM	ANSWER
1	For $y = 4x - 6$, state the slope and y-intercept.	Slope: 4. y-intercept: -6.
2	Rewrite $3x + y = 12$ in $y = mx + b$ form. Then state the slope and y-intercept.	$y = -3x + 12$; slope: -3; y-intercept: 12.
3	Rewrite $y + 2 = -4(x - 6)$ in $y = mx + b$ form. Then state the slope and y-intercept.	$y = -4x + 22$; slope: -4; y-intercept: 22.
4	A line has slope 2 and passes through (4, -3). Write its equation in $y = mx + b$ form.	$y = 2x - 11$
5	For $y = 6x - 24$, find the x-intercept and the y-intercept.	x-intercept: (4, 0). y-intercept: (0, -24).
6	A line passes through (0, -4) and (2, 2). Write its equation in $y = mx + b$ form. State whether the graph rises or falls from left to right.	$y = 3x - 4$. The graph rises from left to right.

PART 2 • APPLY IT

- $y = 2x + 3$; slope: 2, meaning \$2 per minute; y-intercept: 3, meaning the \$3 unlock fee; an 8-minute ride costs \$19.** Use the per-minute charge as the slope and the unlock fee as the y-intercept. Substitute $x = 8$ to get $y = 19$.
- $y = 4x + 12$; the graph rises from left to right; after 6 days, there are 36 subscribers.** The daily gain is the slope, and the starting number is the y-intercept. Substitute $x = 6$ to get $y = 36$.

CHALLENGE

The lines intersect at (4, 8). At $x = 4$, both functions have the same y-value, 8.

Accept equivalent equation forms, such as $2x - y = 11$ for $y = 2x - 11$. For graph descriptions, accept equivalent language such as increasing for rises from left to right and decreasing for falls from left to right.