LESSON MAKER PRO

Graph the Change

Find key points, then trace each function.

HIGH SCHOOL · F-IF.7b

F-IF.7b "Graph square root and piecewise-defined functions, including absolute value functions."

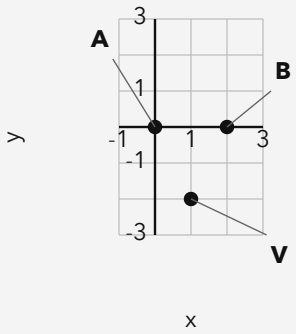
NAME _____ DATE _____

START WITH KEY POINTS

An absolute value graph has a vertex and two straight branches. For a square root graph, choose x-values that make the number under √ a perfect square. For a piecewise graph, use each rule only where it applies, and mark excluded endpoints with open circles.

WORKED EXAMPLE

Which absolute value rule fits the plotted points?



1. V is (1, -2), so write y = a|x - 1| - 2.
2. Use B: 0 = a|2 - 1| - 2.
3. Solve: a = 2.

Answer: y = 2|x - 1| - 2

PRACTICE 4 problems

1 Find the vertex of y = |x - 3| + 5.

ANSWER _____

2 For y = -|x + 4| + 6, find the vertex and the y-value when x = 0.

ANSWER _____

3 For y = √(x + 5) + 3, give the starting point and the point where x = 4.

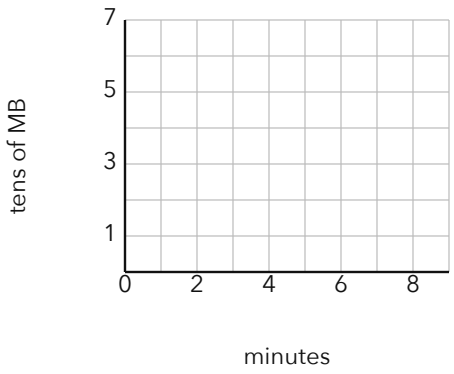
ANSWER _____

4 A function follows y = x + 5 when x < 0 and y = 3x + 5 when x ≥ 0. Find y when x = -3 and when x = 2.

ANSWER _____

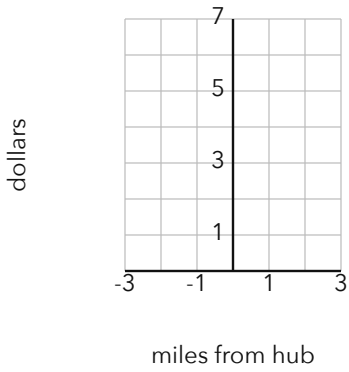
APPLY IT Show your work

1 A game update downloads y tens of MB after x minutes, where $y = 2\sqrt{x}$. On the grid, plot x = 0, 1, 4, 9 and sketch the curve. How many MB have downloaded at minute 9?



ANSWER _____

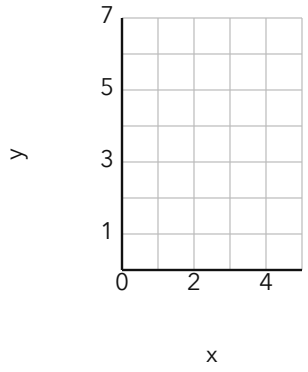
2 A scooter delivery costs y dollars at a location x miles east (+) or west (-) of its hub, where $y = 2|x|$. Plot x = -3, -1, 0, 1, 3 and connect the points. What is the cost at x = -3?



ANSWER _____

CHALLENGE One step up

Graph $y = 2$ when $0 \le x \le 2$, and $y = x + 1$ when $2 < x \le 5$. Which point at $x = 2$ is filled? What is y when $x = 4$?



WORK SPACE AND ANSWER

ANSWER KEY

Graph the Change

HIGH SCHOOL · F-IF.7b

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	Find the vertex of $y = \|x - 3\| + 5$.	**(3, 5)**
2	For $y = -\|x + 4\| + 6$, find the vertex and the y-value when $x = 0$.	**Vertex: (-4, 6); when x = 0, y = 2.**
3	For $y = \sqrt{(x + 5)} + 3$, give the starting point and the point where $x = 4$.	**Starting point: (-5, 3); at x = 4: (4, 6).**
4	A function follows $y = x + 5$ when $x < 0$ and $y = 3x + 5$ when $x \geq 0$. Find y when $x = -3$ and when $x = 2$.	**At x = -3, y = 2; at x = 2, y = 11.**

PART 2 · APPLY IT

1. **Plot (0, 0), (1, 2), (4, 4), (9, 6) and sketch an increasing square root curve through them. At minute 9, 60 MB have downloaded.** At $x = 9$, $y = 2\sqrt{9} = 6$ tens of MB, or 60 MB.
2. **Plot (-3, 6), (-1, 2), (0, 0), (1, 2), (3, 6) and connect them to form a V. The cost is $6.** The distance $|-3| = 3$ miles, so the cost is $2(3) = \$6$.

CHALLENGE

Draw a horizontal segment from filled (0, 2) to filled (2, 2). Draw a rising segment from open (2, 3) to filled (5, 6). The filled point at x = 2 is (2, 2), and y = 5 when x = 4.

Accept additional correct points on a graph if the shape and endpoints are accurate. The challenge must show an open circle at (2, 3) and a filled circle at (2, 2).