LESSON MAKER PRO

# Graph the Switch

*Plot the pieces, then check their endpoints.*

**GRADE 8 · 8A.AF.J.32.b**

**8A.AF.J.32.b** "Graph piecewise-defined functions, including step functions and absolute value functions."

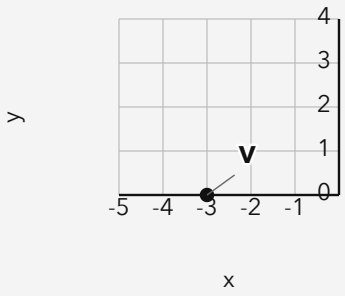
NAME _____ DATE _____

## GRAPH EACH PIECE

Graph each rule only for its allowed x-values. At a boundary, use an open circle for < or > and a filled circle for ≤ or ≥. An absolute value graph makes a V, while a constant rule makes a flat step.

### WORKED EXAMPLE

Use V on the grid to graph $y = |x + 3|$ for $x < -2$ and $y = 4$ for $x \geq -2$.




1. Plot (-5, 2) and (-4, 1). Connect them to V.
2. Continue the V to an open circle at (-2, 1).
3. Fill (-2, 4) and draw a horizontal line to the right.

**Answer: A V through (-5, 2), (-4, 1), and V(-3, 0) ends with an open circle at (-2, 1). A horizontal line at y = 4 starts with a filled circle at (-2, 4).**

## PRACTICE 4 problems

**1** To graph $y = 0$ for $x < 1$ and $y = |x + 1|$ for $x \geq 1$, find both points at $x = 1$. Which is filled?

**ANSWER** _____

**2** To graph $y = 2$ for $x \leq 0$ and $y = -1$ for $x > 0$, find both points at $x = 0$. Which is filled?

**ANSWER** _____

**3** To graph $y = |x - 2| + 1$, find the vertex and y-intercept.

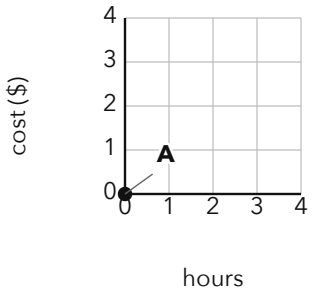
**ANSWER** _____

**4** To graph $y = -|x - 1| + 2$, find the vertex and the point where $x = 0$.

**ANSWER** _____

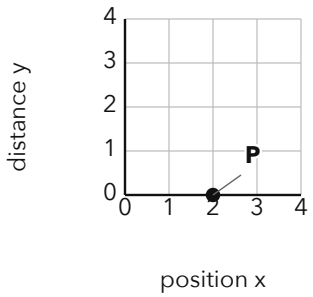
## APPLY IT Show your work

**1** A game server costs $1 for each started hour and $0 for no time. Use A on the grid to graph the cost for 0 to 4 hours. Mark open and filled endpoints.




**ANSWER** _____

**2** A skater rides along a straight path from position 0 to 4. P marks a checkpoint at position 2. On the grid, graph distance y from P at each position x.




**ANSWER** _____

## CHALLENGE One step up

On your own axes, graph $y = |x - 1|$ for $0 \le x < 2$ and $y = 3$ for $2 \le x \le 5$. Explain which point at $x = 2$ is filled.

WORK SPACE AND ANSWER

ANSWER KEY

# Graph the Switch

GRADE 8 · 8A.AF.J.32.b

## PART 1 · PRACTICE

| # | PROBLEM | ANSWER |
|---|---|---|
| 1 | To graph y = 0 for x < 1 and y = \|x + 1\| for x ≥ 1, find both points at x = 1. Which is filled? | **(1, 0) is open; (1, 2) is filled.** |
| 2 | To graph y = 2 for x ≤ 0 and y = -1 for x > 0, find both points at x = 0. Which is filled? | **(0, 2) is filled; (0, -1) is open.** |
| 3 | To graph y = \|x - 2\| + 1, find the vertex and y-intercept. | **Vertex: (2, 1); y-intercept: (0, 3).** |
| 4 | To graph y = -\|x - 1\| + 2, find the vertex and the point where x = 0. | **Vertex: (1, 2); point: (0, 1).** |

## PART 2 · APPLY IT

1. **Fill A(0, 0). Draw horizontal steps at y = 1, 2, 3, and 4 over 0 < x ≤ 1, 1 < x ≤ 2, 2 < x ≤ 3, and 3 < x ≤ 4, respectively. Each step has an open left endpoint and a filled right endpoint.** Each started hour adds $1. The cost jumps just after each whole hour, but at a whole hour the lower step still applies.
2. **Draw the V-shaped graph y = |x - 2| through (0, 2), (1, 1), P(2, 0), (3, 1), and (4, 2). Include both endpoints.** Distance from position 2 is |x - 2|. Plot the distances at positions 0 through 4 and connect the points.

## CHALLENGE

**Draw a V through filled (0, 1) and (1, 0), ending open at (2, 1). Draw a horizontal segment from filled (2, 3) to filled (5, 3). The point (2, 3) is filled because the y = 3 rule includes x = 2.**

Accept clear hand-drawn graphs with the stated points, segments, and endpoint markings. In the server graph, (0, 0) is filled and (0, 1) is open.