ALBERT

Name _____ Date _____

Graphing Piecewise and Absolute Value Functions Worksheet

Algebra 1 · Common Core HSF-IF.C.7b

> Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases. b. Graph square root, cube root, and piecewise-defined functions, including step functions and absolute value functions.

Practice

Builds the skill step by step.

1. $f(x) = |x|$. What is $f(-5)$?

2. What is the vertex of the graph of $f(x) = |x - 2| + 1$?

3. $f(x) = \sqrt{x}$. What is $f(16)$?

4. $f(x)$ is the cube root of x. What is $f(-27)$?

5. $f(x) = 2x$ when x is less than 0, and $f(x) = x + 1$ when $x \geq 0$. What is $f(-3)$?

6. $f(x) = 2x$ when x is less than 0, and $f(x) = x + 1$ when $x \geq 0$. What is $f(4)$?

7. The step function f(x) gives the greatest integer less than or equal to x. What is f(3.7)?

8. Parking costs 5 dollars for each hour or part of an hour. What does 2.5 hours cost?

9. What shape is the graph of y = |x|?

   A. a circle

   B. a U

   C. a V

   D. a straight line

10. f(x) = √(x − 1). At what x-value does its graph start?

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On Level

Grade-level practice.

1. What is the maximum value of $f(x) = -|x + 3| + 4$?

2. What is the vertex of the graph of $f(x) = |x + 3| - 2$?

3. $f(x) = |x| - 5$. What are its x-intercepts? List them from least to greatest.

4. $f(x) = x^2$ when x is less than 1, and $f(x) = 3x - 1$ when $x \geq 1$. What is $f(-2) + f(3)$?

5. The step function $f(x)$ gives the greatest integer less than or equal to x. What is $f(-1.5)$?

6. A shipping company charges 4 dollars for packages up to 1 pound, 6 dollars for over 1 up to 2 pounds, and 8 dollars for over 2 up to 3 pounds. Explain why the cost is a step function.

7. $f(x) = (\sqrt{x}) + 2$. What is $f(9)$?

8. $f(x) = 2\sqrt{x}$. For what x is $f(x) = 10$?

9. Which describes the graph of $y = \sqrt{x}$?

   A. It starts at (0, 0) and rises more and more slowly.

   B. It is a V shape.

   C. It is a straight line through the origin.

   D. It is a parabola opening down.

10. For what x is $|2x - 6| = 0$?

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Challenge

Multi-step and word problems that stretch it.

1. Solve $|x - 4| = 6$. List the solutions from least to greatest.

2. $f(x) = |x + 1| + |x - 1|$. What is $f(3)$?

3. A phone plan costs 30 dollars for up to 2 GB, plus 10 dollars for each extra GB or part of a GB. What does 4.5 GB cost?

4. The cube root of x, plus 1, equals 4. What is x?

5. $f(x) = -2|x - 1| + 6$. What are its x-intercepts? List them from least to greatest.

6. $f(x) = x + 2$ when x is less than 1, and $f(x) = 4 - x$ when $x \geq 1$. Do the two pieces meet at $x = 1$?

   A. Yes: both give 3 at $x = 1$.

   B. No: there is a jump.

   C. No: the pieces are parallel.

   D. Only if x is negative.

7. What is the minimum value of $f(x) = |x - 3| + |x + 1|$?

8. Compare the graphs of $y = |x|$ and $y = |x - 2| + 3$.

9. Solve $\sqrt{(x + 5)} = 4$.

10. A taxi charges 3 dollars plus 2 dollars for each mile or part of a mile. What does a 4.2-mile ride cost?