Ready, Set, Go!

Ready

Topic: Solving absolute value equations.

Solve for x. (You will have two answers.)

1. \(|x| = 7\)
   \[ x = \pm 7 \]

2. \(|x - 6| = 3\)
   \[ x = 9, 3 \]

3. \(|w + 4| = 11\)
   \[ w = 7, -15 \]

4. \(-9|m| = -63\)
   \[ m = \pm 7 \]

5. \(|3d| = 15\)
   \[ d = \pm 5 \]

6. \(|3x - 5| = 11\)
   \[ 3x - 5 = 1 \]
   \[ 3x - 5 = -11 \]
   \[ x = \frac{14}{3}, x = -2 \]

7. \(-|m + 3| = -13\)
   \[ m = 10 \]
   \[ m = -10 \]

8. \(|-4m| = 64\)
   \[ m = \pm 16 \]

9. \(2|x + 1| - 7 = -3\)
   \[ x + 1 = 2 \]
   \[ x + 1 = -2 \]

10. \(5|c + 3| - 1 = 9\)

11. \(-2|2p - 3| - 1 = -11\)

12. Explain why the equation \(|m| = -3\) has no solution.

   B/c we cannot have a negative distance.

Set

Topic: Reading the domain and range from a graph

State the domain and range of the piece-wise functions in the graph. Use interval notation.

13.

a. Domain:
   \[ [-2, 7] \]

b. Range:
   \[ [-3, 6] \]

14.

a. Domain:
   \[ [-3, 6] \]

b. Range:
   \[ [-2, 2] \]
For each of the graphs below write the interval that defines each piece of the graph. Then write the domain of the entire piece-wise function.

Example: (Look at the graph in #14. Moving left to right. Piece-wise functions use set notation.)
Interval 1 \(-3 \leq x < 0\)
Interval 2 \(0 \leq x < 4\)
Interval 3 \(4 \leq x \leq 6\)
Domain: \([-3,6]\) (We can use interval notation on the domain, if it's continuous.)

Pay attention to your inequality symbols! You do not want the pieces of your graph to overlap. Do you know why?

15. a. Interval 1 \(-2 \leq x \leq 0\)
b. Interval 2 \(0 \leq x \leq 4\)
c. Interval 3 \(4 \leq x \leq 6\)
d. Domain: \([-2,6]\)

16. a. Interval 1 \(-5 \leq x \leq 0\)
b. Interval 2 \(0 \leq x \leq 3\)
c. Interval 3 \(3 \leq x \leq 5\)
d. Domain: \([-5,5]\)

17. So far you’ve only seen continuous piece-wise defined functions, but piece-wise functions can also be non-continuous. In fact, you’ve had some real life experience with one kind of non-continuous piece-wise function. The graph below represents how some teachers calculate grades. Finish filling in the piece-wise equation. Then label the graph with the corresponding values.

\[
f(x) = \begin{cases} 
A, & 80 \leq x \leq 100 \\
B, & 70 \leq x \leq 80 \\
C, & 60 \leq x \leq 70 \\
D, & 50 \leq x \leq 60 \\
F, & 0 \leq x \leq 50 
\end{cases}
\]

© 2013 MATHEMATICS VISION PROJECT | MVP
In partnership with the Utah State Office of Education
Licensed under the Creative Commons Attribution-NonCommercial-ShareAlike 3.0 Unported license
Write the piece-wise equations for the given graphs.

Go

Topic: Transformations on quadratic equations

Beginning with the parent function \( f(x) = x^2 \), write the equation of the new function \( g(x) \) that is a transformation of \( f(x) \) as described. Then graph it.

20. Shift \( f(x) \) left 3 units, stretch vertically by 2, reflect \( f(x) \) vertically, and shift down 5 units.
   \[ g(x) = \frac{2}{(x+3)^2} - 5 \]

21. Shift \( f(x) \) right 1, stretch vertically by 3, and shift up 4 units.
   \[ g(x) = \frac{3}{(x-1)^2} + 4 \]

22. Shift \( f(x) \) up 3 units, left 6, reflect vertically, and stretch by \( \frac{1}{2} \)
   \[ g(x) = \frac{1}{2}(-x+6)^2 + 3 \]