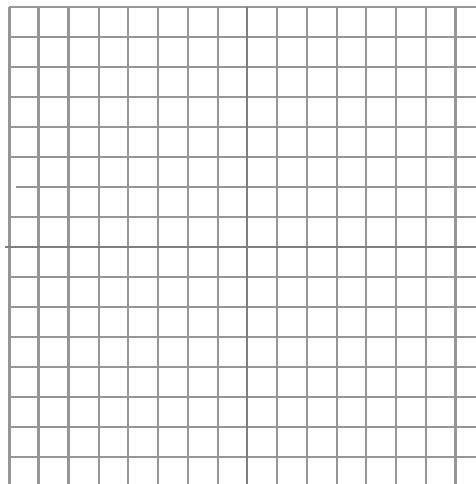


0. Graph the function $f(x) = |x|$. Identify the *Axis of Symmetry*, the *Vertex*, the *Domain*, and *Range*.

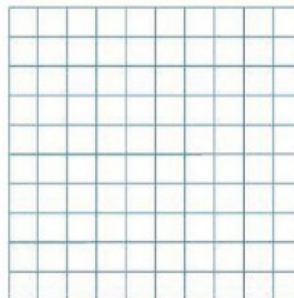


Problem 1 Graphing an Absolute Value Function Page 92

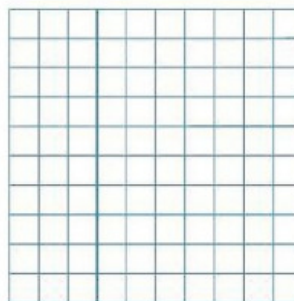
Practice Make a table of values for each equation. Then graph the equation.

Also, find the domain and range.

1. $y = |x| + 1$



2. $y = |x| - 3$



The transformations you studied in Lesson 2-4 also apply to absolute value functions.

Take note

Key Concept The Family of Absolute Value Functions

Parent Function $y = |x|$

Vertical Translation

Translation up k units, $k > 0$

$$y = |x| + k$$

Translation down k units, $k > 0$

$$y = |x| - k$$

Vertical Stretch and Compression

Vertical stretch, $a > 1$

$$y = a|x|$$

Vertical compression, $0 < a < 1$

$$y = a|x|$$

Horizontal Translation

Translation right h units, $h > 0$

$$y = |x - h|$$

Translation left h units, $h > 0$

$$y = |x + h|$$

Reflection

In the x -axis

$$y = -|x|$$

In the y -axis

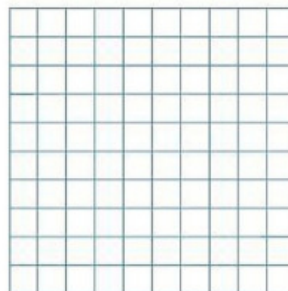
$$y = |-x|$$

Problem 2 Combining Translations Page 93

A Practice In Exercises 3 and 4, make a table of values for each equation. Then graph the equation.

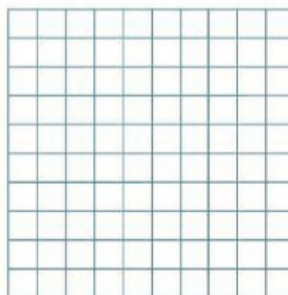
Also, find the domain and range.

3. $y = |x + 6| - 1$



Page 94

4. $y = |x - 5| + 4$



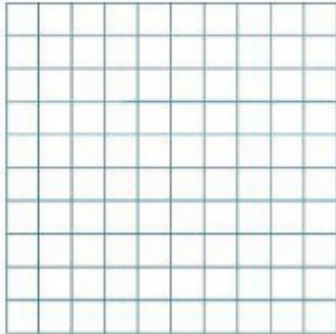
The right branch of the graph of $y = |x|$ has slope 1. The graph of $y = a|x|$, $a > 0$, is a stretch or compression of the graph of $y = |x|$. Its right branch has slope a . The graph of $y = -a|x|$ is a reflection of $y = a|x|$ in the x -axis and its right branch has slope $-a$.

Problem 3 Vertical Stretch and Compression Page 94

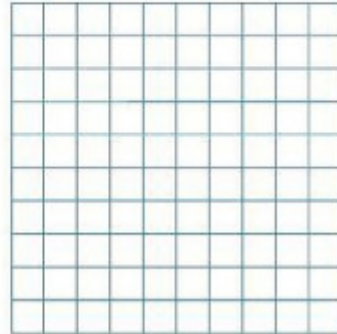
Practice Graph each equation. Then describe the transformation from the parent function $f(x) = |x|$.

Also, find the domain and range.

5. $y = 3|x|$



6. $y = -\frac{3}{4}|x|$



Problem 5 Writing an Absolute Value Function Page 95

Practice Write an absolute value equation for each graph.

Also, find the domain and range.

