

Families of Graphs

Describe how the graphs of $f(x)$ and $g(x)$ are related.

1. $f(x) = x^2$ and $g(x) = (x + 3)^2 - 1$

$g(x)$ is the graph of $f(x)$ translated left 3 units and down 1 unit.

2. $f(x) = |x|$ and $g(x) = -|2x|$

$g(x)$ is the graph of $f(x)$ reflected over the x -axis and compressed horizontally by a factor of 0.5.

Use the graph of the given parent function to describe the graph of each related function.

3. $f(x) = x^3$

a. $y = 2x^3$

expanded vertically by a factor of 2

b. $y = -0.5(x - 2)^3$

reflected over the x -axis, translated right 2 units, compressed vertically by a factor of 0.5

c. $y = |(x + 1)^3|$

translated left 1 unit, portion below the x -axis reflected so that it is above the x -axis

4. $f(x) = \sqrt{x}$

a. $y = \sqrt{x + 3} + 1$

translated left 3 units and up 1 unit

b. $y = \sqrt{-x} - 2$

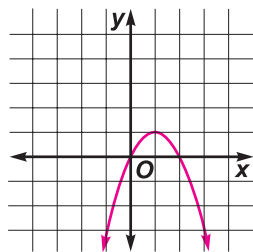
reflected over the y -axis, translated down 2 units

c. $y = \sqrt{0.25x} - 4$

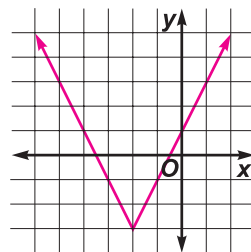
expanded horizontally by a factor of 4, translated down 4 units

Sketch the graph of each function.

5. $f(x) = -(x - 1)^2 + 1$



6. $f(x) = 2|x + 2| - 3$



7. **Consumer Costs** During her free time, Jill baby-sits the neighborhood children. She charges \$4.50 for each whole hour or any fraction of an hour. Write and graph a function that shows the cost of x hours of baby-sitting.

$$f(x) = \begin{cases} 4.5 & \text{if } [x] = x \\ 4.5[x + 1] & \text{if } [x] < x \end{cases}$$

