

**GRAPHING USING TRANSFORMATIONS WORKSHEET**

Transformations: $y = a\sqrt{x-h} + k$ $y = a\sqrt[3]{x-h} + k$

a : If $a < 0$, the graph is reflected over the x -axis. If $0 < |a| < 1$, the graph is compressed vertically (or stretched horizontally. If $|a| > 1$, the graph is stretched vertically.

h : The graph is shifted h units horizontally.

k : The graph is shifted k units vertically.

Describe how the graph of each function will differ from the graph of its corresponding parent function.

1. $f(x) = \sqrt{x-9}$

2. $f(x) = \sqrt[3]{x+4} + 8$

3. $f(x) = -2 + \sqrt{7-x}$

4. $f(x) = -\sqrt[3]{4x+1} - 6$

5. $f(x) = \frac{1}{2}\sqrt{x} - 4$

6. $f(x) = \sqrt[3]{-\frac{1}{3}x} + 1$

Write an equation for the function described below.

7. A square root function that has been vertically shrunk by a factor of $1/4$ and translated two units to the right and eight units down.

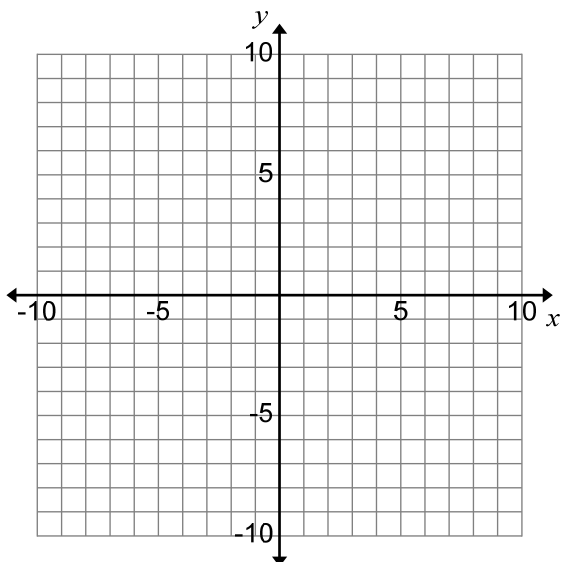
8. A cube root function that has been reflected over the x -axis and translated three units left and seven units up.

9. A cube root function that has been reflected over the y -axis, horizontally stretched by a factor of $1/2$ and translated six units left and six units down.

10. A square root function that has been reflected over both the x -axis and the y -axis.

Graph each function, without a calculator, using transformations. Then, state the domain and range of each function.

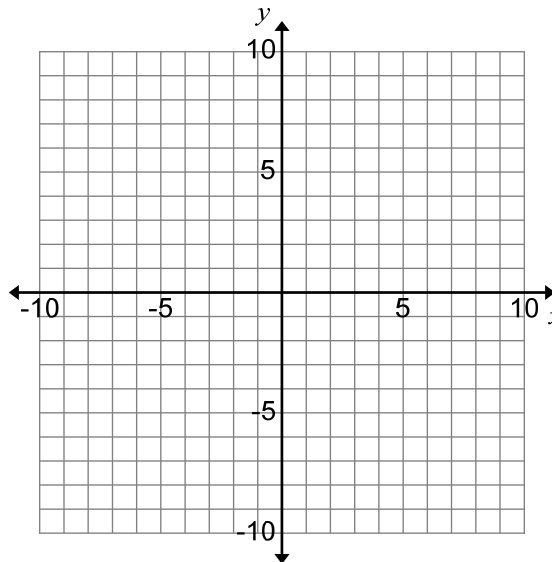
11. $y = \sqrt{x + 1} + 2$



D:

R:

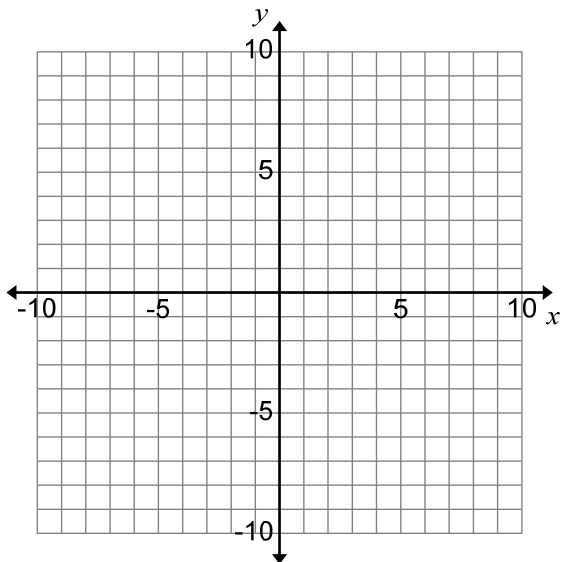
12. $y = -\sqrt[3]{x} - 3$



D:

R:

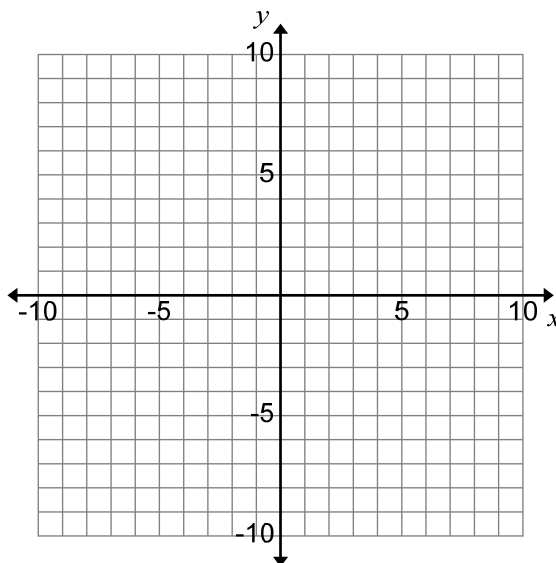
13. $y = \sqrt{x + 4}$



D:

R:

14. $y = \sqrt[3]{-x - 1} - 1$



D:

R: