

6-8 Graphing Radical Equations

Target 4E. Graph, transform and identify the key features of the square root and cube root functions

Square Root Parent Function $f(x) = \sqrt{x}$

Cube Root Parent Function $f(x) = \sqrt[3]{x}$

$$f(x) = a^n \sqrt{x-h} + k$$

- (h, k) is called the vertex of function
- " h " translates (shifts) the graph left $\sqrt{x+h}$ and right $\sqrt{x-h}$
- " k " translates (shifts) the graph UP and down
- " a " shrinks (compresses) and stretches the graph by factor a
 - $a > 1$ or $a < -1 \rightarrow$ vertical stretch
 - $-1 < a < 1, (a \neq 0) \rightarrow$ vertical shrink
- " $-a$ " reflects the graph over x-axis

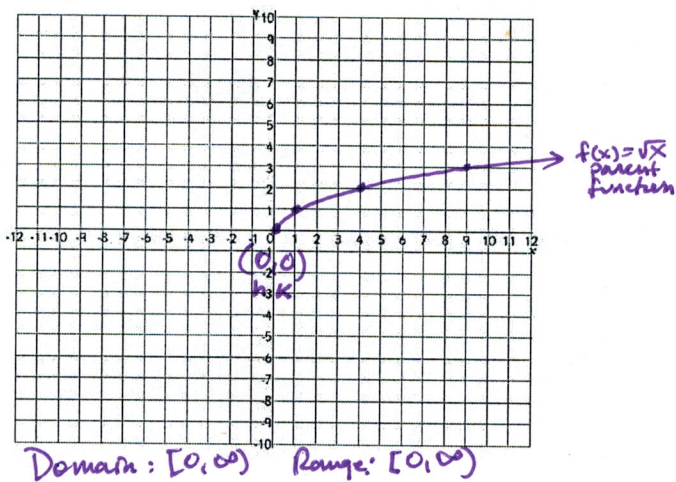
Handwritten notes in cloud shapes:

Square Root Function
 $f(x) = \sqrt{x}$ parent
 Domain: $[0, \infty)$
 Range: $[0, \infty)$

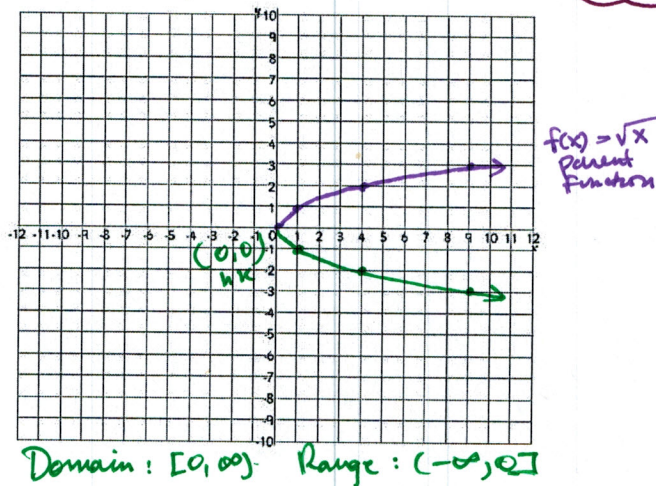
Cube Root Function
 $f(x) = \sqrt[3]{x}$ parent
 Domain: $(-\infty, \infty)$
 Range: $(-\infty, \infty)$

Graph each radical equation and determine its domain and range. When graphing, plot accurate points.

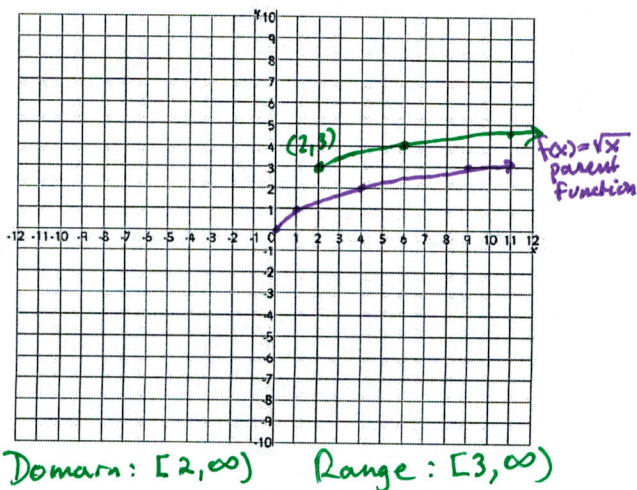
1. $f(x) = \sqrt{x}$



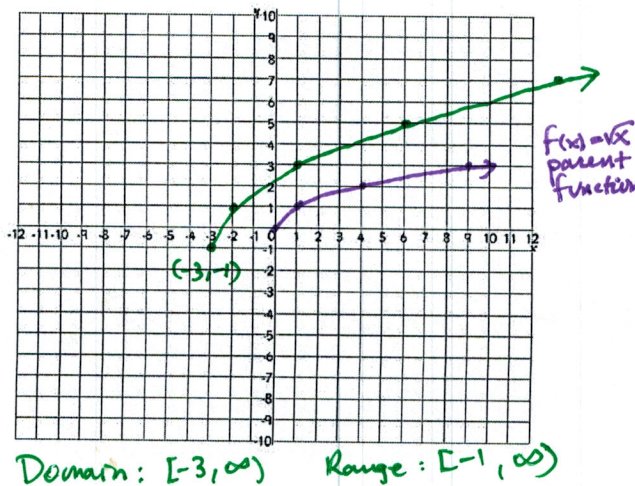
2. $f(x) = -\sqrt{x}$



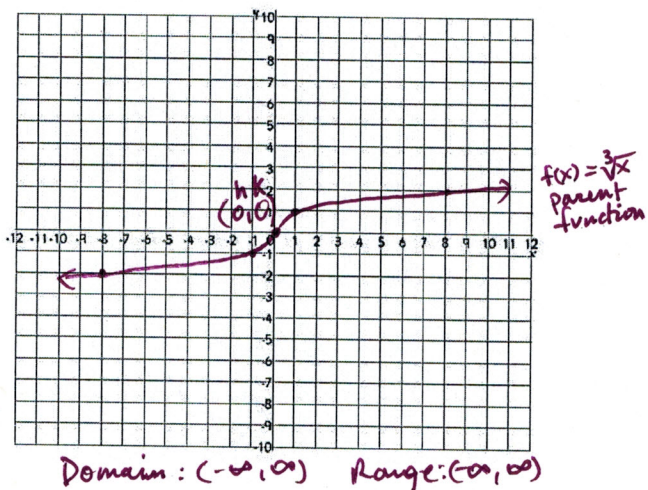
3. $f(x) = \frac{1}{2} \sqrt{x-2} + 3$ $(2, 3)$
 h k



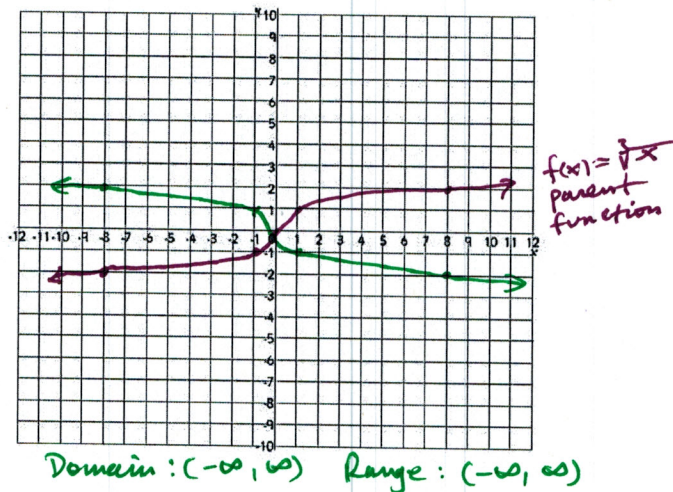
4. $f(x) = 2\sqrt{x+3} - 1$ $(-3, -1)$
 h k



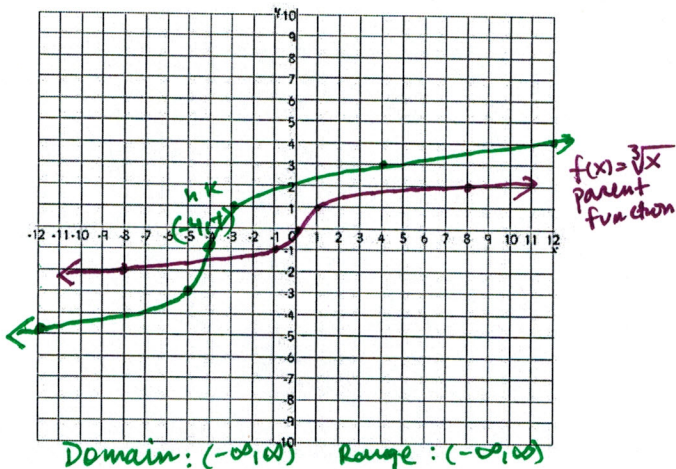
5. $f(x) = \sqrt[3]{x}$



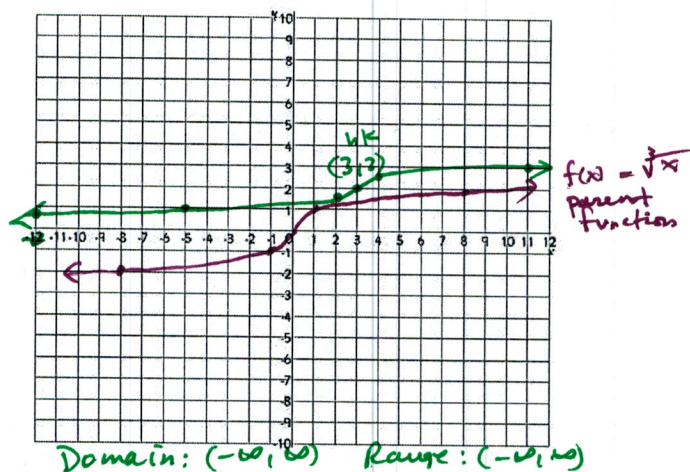
6. $f(x) = -\sqrt[3]{x}$



7. $f(x) = 2\sqrt[3]{x+4} - 1$ $(-4, -1)$



8. $f(x) = \frac{1}{2}\sqrt[3]{x-3} + 2$



9. Describe the transformation (compared to the parent function) of each of the following:

- a) #2 Reflection over x-axis.
- b) #3 Translation 2 to the right and 3 up and a vertical shrink by a factor of $\frac{1}{2}$.
- c) #4 Translation 3 to the left and 1 down and a vertical stretch by a factor of 2.
- d) #7 Translation 4 to the left and 1 down and a vertical stretch by a factor of 2.
- e) #8 Translation 3 to the right and 2 up and a vertical shrink by a factor of $\frac{1}{2}$.