# Graphing Cubic and Cube Root Functions

Cubic vertex form:

$$y = a(x - h)^3 + k$$

Cube root vertex form:

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

Find the vertex of:

$y = \sqrt[3]{x + 4} - 3$

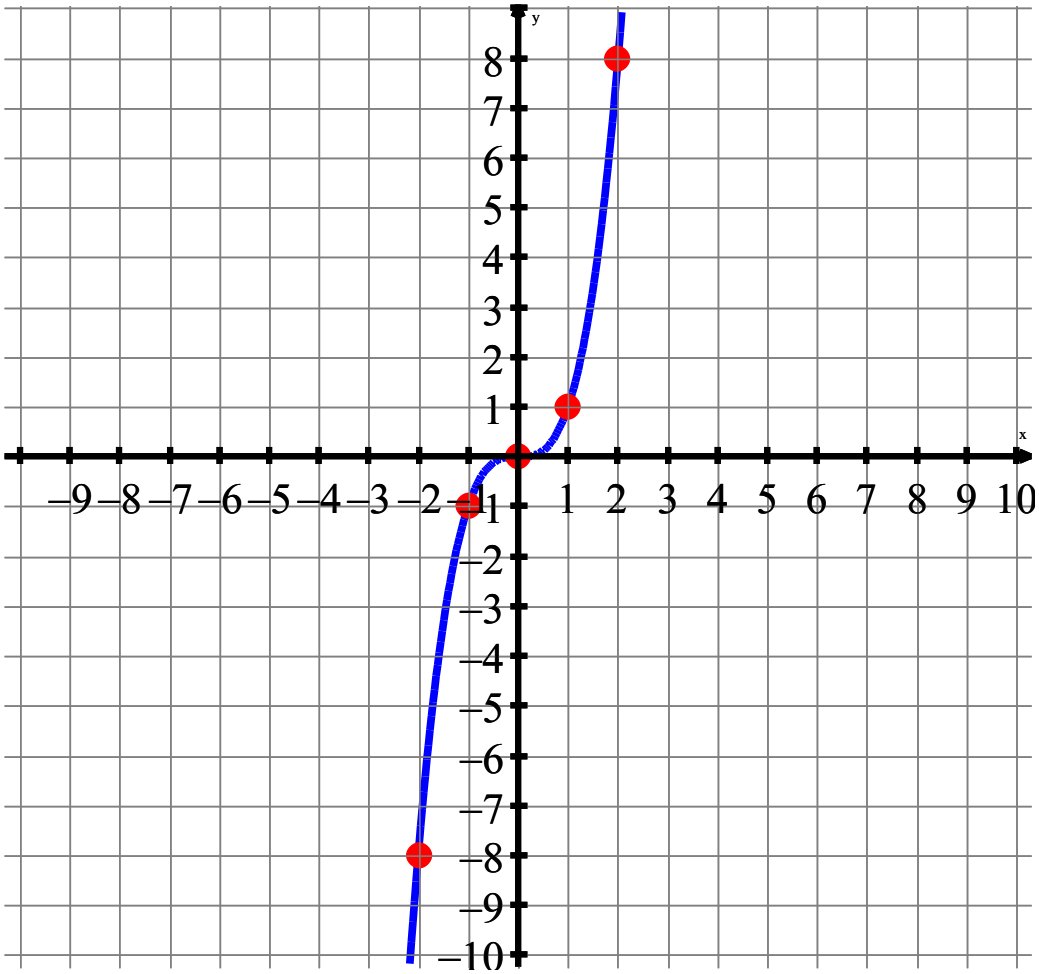
Vertex: (-4, -3)

$y = 2(4x + 12)^3 + 5$

$y = 2(4(x + 3))^3 + 5$

Vertex: (-3, 5)

# Graph the cubic parent function: $f(x) = x^3$




Vertex: $(0, 0)$

y-intercept: (0, 0)

x-intercept: (0, 0)

Decreasing: Never

Increasing: $(-\infty, \infty)$

Domain: $(-\infty, \infty)$

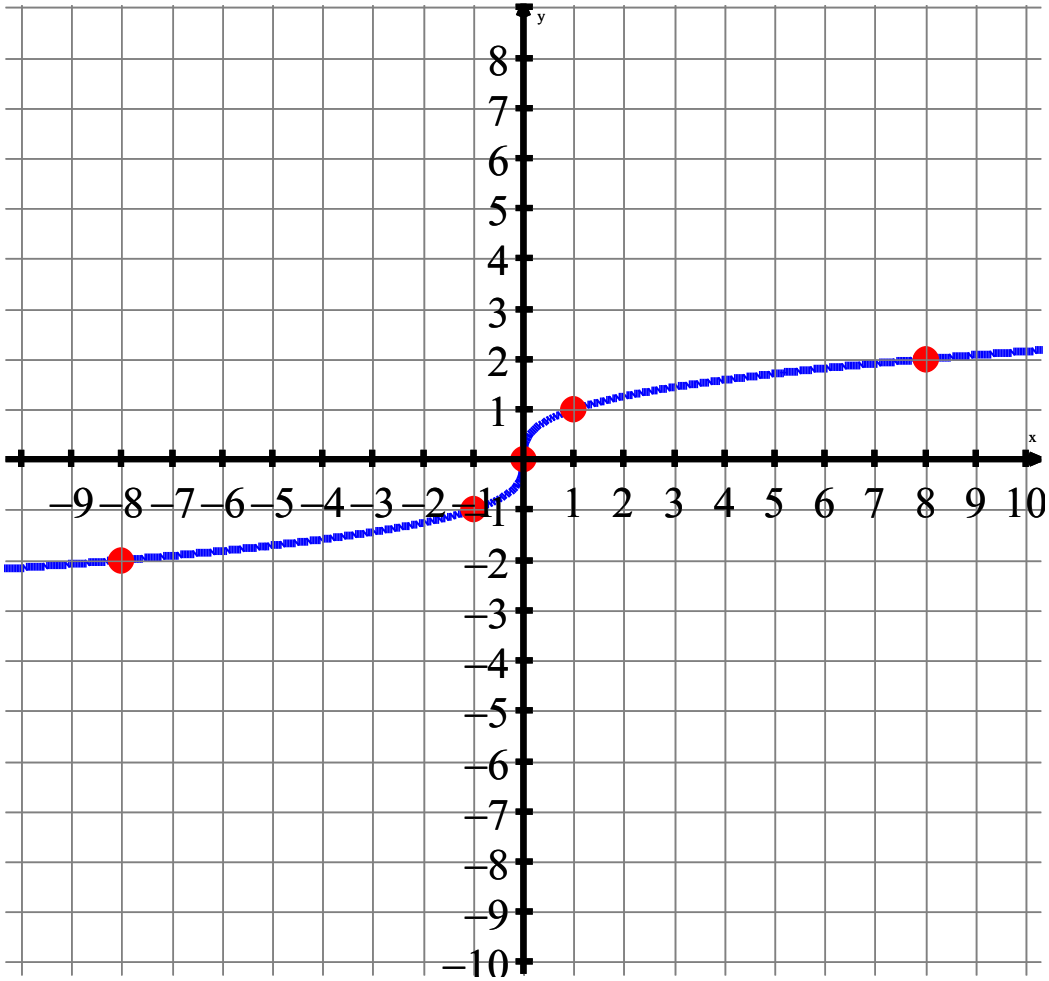
Range: $(-\infty, \infty)$

End behavior:

As $x \to \infty$, $f(x) \to \infty$

As $x \to -\infty$, $f(x) \to -\infty$

# Graph the cube root parent function: $f(x) = \sqrt[3]{x}$




Vertex: $(0, 0)$

y-intercept: (0, 0)

x-intercept: (0, 0)

Decreasing: Never

Increasing: $(-\infty, \infty)$

Domain: $(-\infty, \infty)$

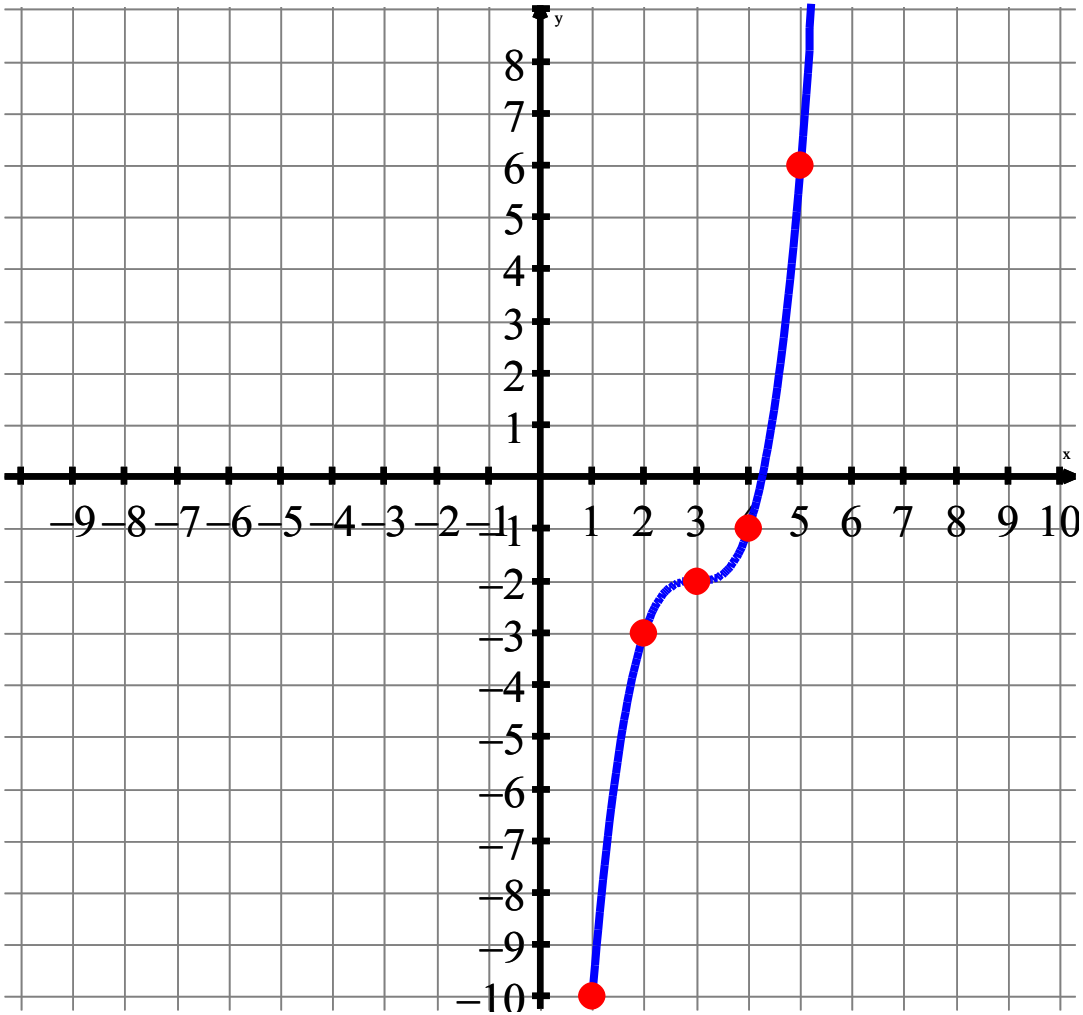
Range: $(-\infty, \infty)$

End behavior:

As $x \to \infty$, $f(x) \to \infty$

As $x \to -\infty$, $f(x) \to -\infty$

# Graph $f(x) = (x-3)^3 - 2$ and identify its attributes.




Vertex: (3, -2)

y-intercept: (0 ,-29)

x-intercept: (4.26, 0)

Decreasing: Never

Increasing: (-∞, ∞)

Domain: (-∞, ∞)

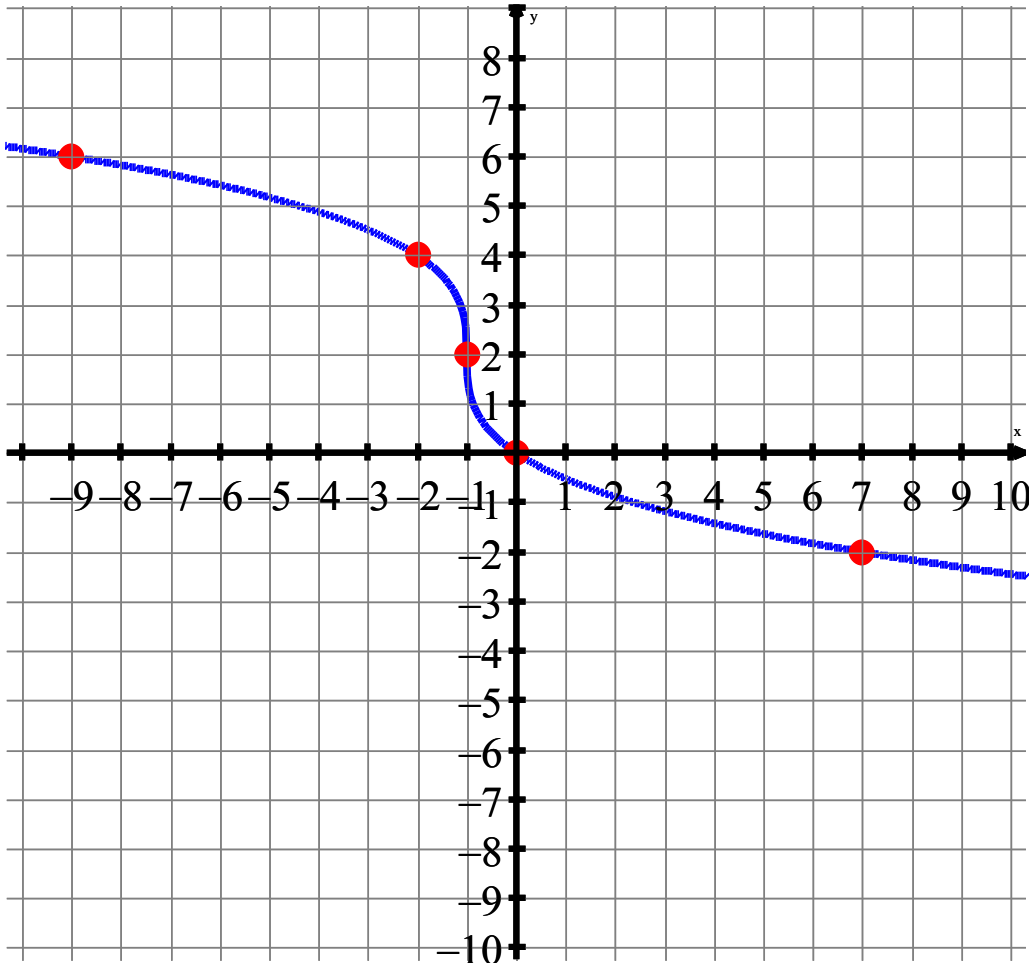
Range: (-∞, ∞)

End behavior:

As $x \to \infty$, $f(x) \to \infty$

As $x \to -\infty$, $f(x) \to -\infty$

Graph $f(x) = -2\sqrt[3]{x+1} + 2$ and identify its attributes.




Vertex: (-1, 2)

y-intercept: (0 ,0)

x-intercept: (0, 0)

Decreasing:(-∞, ∞)

Increasing: Never

Domain: (-∞, ∞)

Range: (-∞, ∞)

End behavior:

As $x \to \infty$, $f(x) \to -\infty$

As $x \to -\infty$, $f(x) \to \infty$