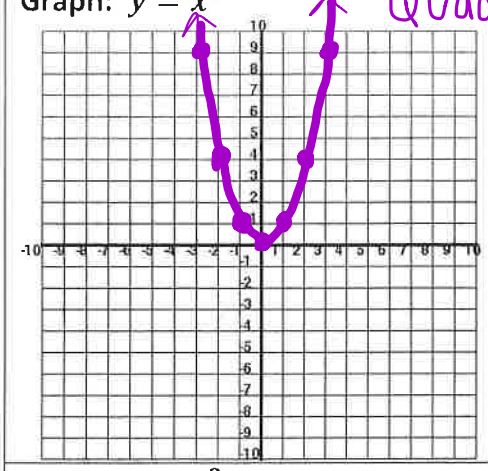
Math 2
Unit 4 – Radical & Rational Functions
Lesson 2 → Square Root & Cube Root Graphs

Name_____
Date_____ Pd_____

➢ Graphs of **Parent Functions:**

Graph: $y = x^2$ Quadratic

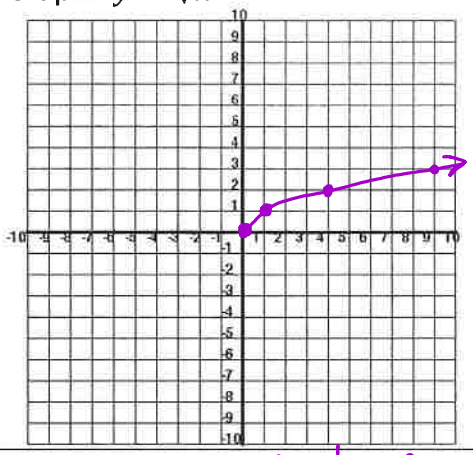


Vertex: (0,0)

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

Range: $[0, \infty)$

Graph: $y = \sqrt[2]{x}$ Square root

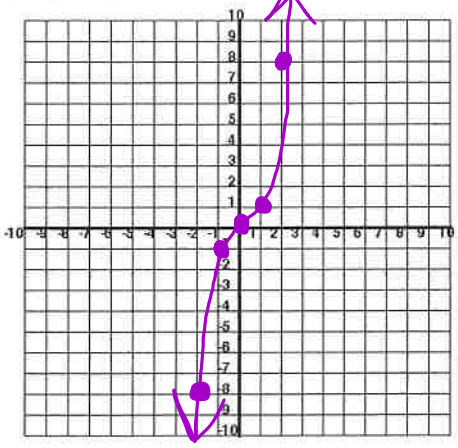


Vertex: (0,0)

Domain: $[0, \infty)$

Range: $[0, \infty)$

Graph: $y = x^3$



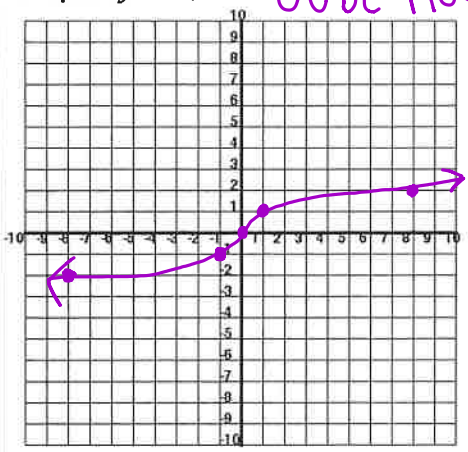
Vertex: (0,0)

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

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

Cubic

Graph: $y = \sqrt[3]{x}$ Cube Root



Vertex: (0,0)

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

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

➢ **Recall Transformation Rules:**

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

If a is negative, then the graph is a reflection across the x-axis

Vertical Stretch $|a| > 1$ (makes it narrower)

Vertical Compression $0 < |a| < 1$ (makes it wider)

Vertical Translation

Horizontal Translation (opposite of h)

$y = (x-3)^2 + 2$

R 3 U 2

Quadratic Function	Vertex	Shift Left or Right	Shift Up or Down
$y = (x-3)^2 + 6$	(3,6)	Right 3	Up 6
$y = (x+1)^2$	(-1,0)	L 1	
$y = x^2 - 4$	(0,-4)		D 4

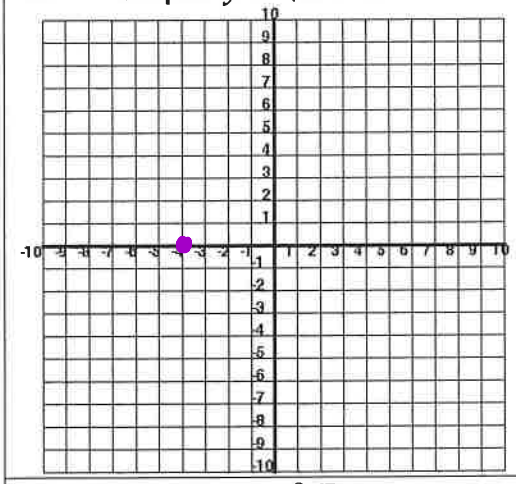
Cubic Function	Vertex	Shift Left or Right	Shift Up or Down
$y = (x+2)^3 - 5$	(-2,-5)	L 2	D 5
$y = x^3 + 7$	(0,7)		U 7
$y = (x-8)^3$	(8,0)	R 8	

Square Root Function	Vertex	Shift Left or Right	Shift Up or Down
$y = \sqrt{x-2} + 5$	(2,5)	R 2	U 5
$y = \sqrt{x} - 1$	(0,-1)		D 1
$y = \sqrt{x+3}$	(-3,0)	L 3	

Cube Root Function	Vertex	Shift Left or Right	Shift Up or Down
$y = \sqrt[3]{x} - 9$	(0,-9)		D 9
$y = \sqrt[3]{x+2} + 4$	(-2,4)	L 2	U 4
$y = \sqrt[3]{x-8}$	(8,0)	R 8	

➢ Graph using Transformation Rules:

1. Graph: $y = \sqrt{x+4}$

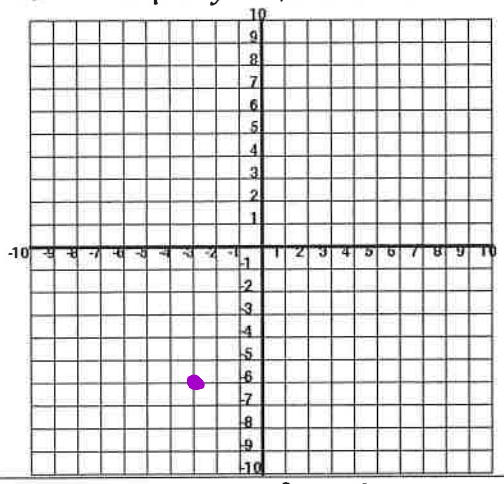


Vertex: (-4,0)

Domain:

Range:

2. Graph: $y = \sqrt{x+3} - 6$

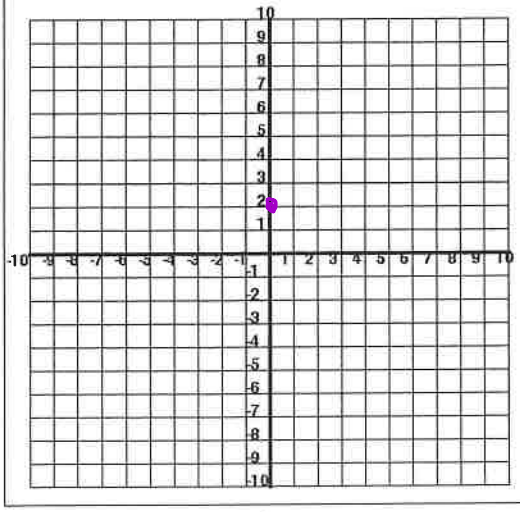


Vertex: (-3,-6)

Domain:

Range:

3. Graph: $y = \sqrt[3]{x} + 2$

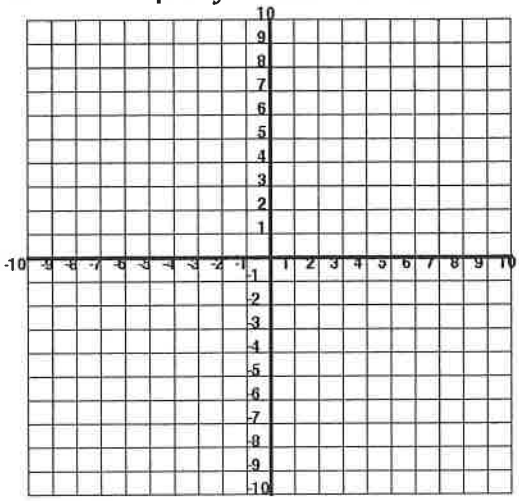


Vertex: (0,2)

Domain:

Range:

4. Graph: $y = \sqrt[3]{x-1} - 3$

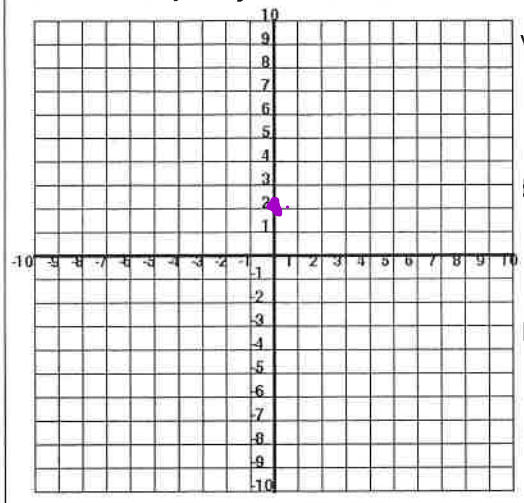


Vertex: (1,-3)

Domain:

Range:

5. **Graph:** $y = -\sqrt{x} + 2$

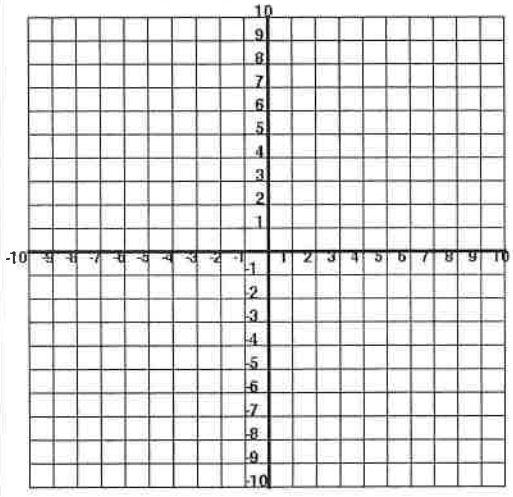


Vertex: (0,2)

Domain:

Range:

6. **Graph:** $y = -\sqrt[3]{x+1}$



Vertex: (-1,0)

Domain:

Range:

7. Write the equation of a **square root** function with a vertex at $(-5, 3)$.

$y = -\sqrt{x+5} + 3$

8. Write the equation of a **square root** function that has been translated right ten units and up six units.

$y = -\sqrt{x-10} + 6$

9. Write the equation of a **cube root** function that has been translated left three units and down two units.

$y = \sqrt[3]{x+3} - 2$

10. Write the equation of a **square root** function that has been translated right four units and reflected across the $x - axis$.

$y = -\sqrt{x-4}$