QUIZ DATE: _____   TEST DATE: _____

Math 2   Name_____
Unit 4 – Radical & Rational Functions   Date_____Pd_____
Lesson 1 → Square Root & Cube Root Graphs

➤ Graphs of **Parent Functions:**
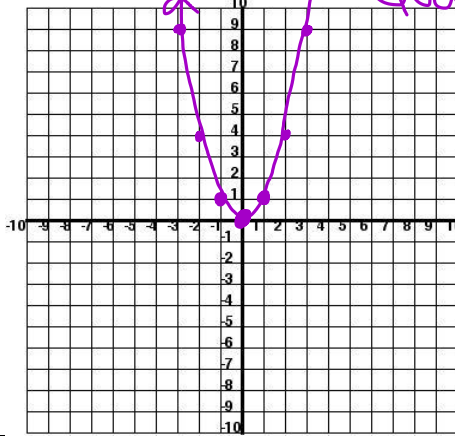
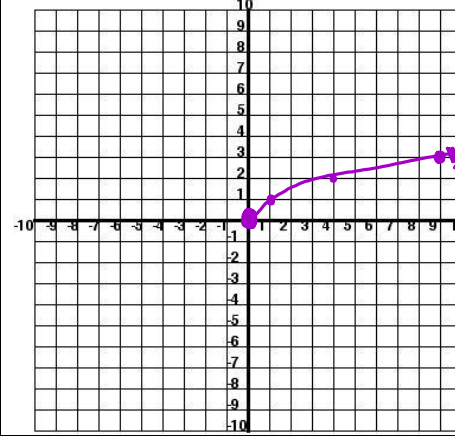**Graph:** $y = x^2$ *Quadratic*

Vertex: $(0,0)$

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

Range: $[0, \infty)$

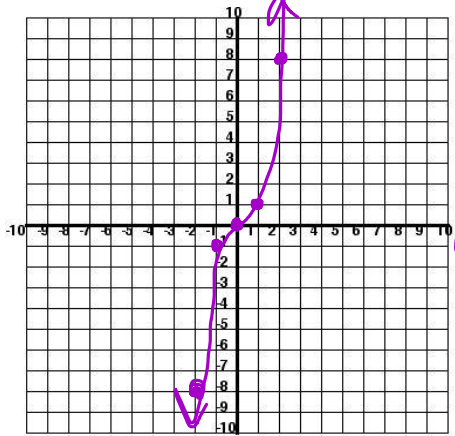**Graph:** $y = \sqrt{x}$

Vertex: $(0,0)$

Domain: $[0, \infty)$

Range: $[0, \infty)$

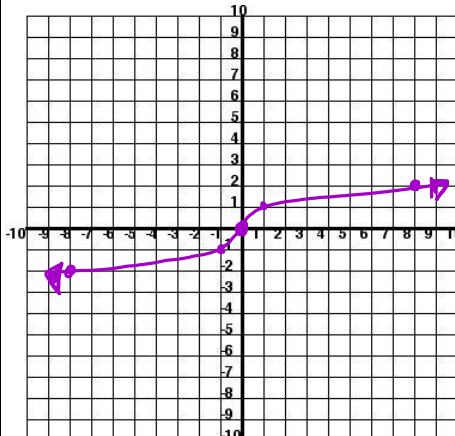**Graph:** $y = x^3$

Vertex: $(0,0)$

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

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

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

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)

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

reflect x-axis   stretch by 3   Right 5   up 4

Quadratic Function	Vertex	Shift Left or Right	Shift Up or Down
$y = (x-3)^2 + 6$	(3,6)	R3	U6
$y = (x+1)^2 + 0$	(-1,0)	L1	N0
$y = x^2 - 4$	(0,-4)	N0	D4

Cubic Function	Vertex	Shift Left or Right	Shift Up or Down
$y = (x+2)^3 - 5$	(-2,-5)	L2	D5
$y = x^3 + 7$	(0,7)	N0	U7
$y = (x-8)^3$	(8,0)	R8	N0

Square Root Function	Vertex	Shift Left or Right	Shift Up or Down
$y = \sqrt{x-2} + 5$	(2,5)	R2	U5
$y = \sqrt{x} - 1$	(0,-1)	N0	D1
$y = \sqrt{x+3}$	(-3,0)	L3	N0

Cube Root Function	Vertex	Shift Left or Right	Shift Up or Down
$y = \sqrt[3]{x} - 9$	(0,-9)	N0	D9
$y = \sqrt[3]{x+2} + 4$	(-2,4)	L2	V4
$y = \sqrt[3]{x-8}$	(8,0)	R8	N0

L3 D6

➢ Graph using Transformation Rules:

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

Vertex: (-4,0)

Domain: $[-4, \infty)$

Range: $[0, \infty)$

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

Vertex: (-3,-6)

Domain: $[-3, \infty)$

Range: $[-6, \infty)$

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

Vertex:

Domain:

Range:

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

Vertex:
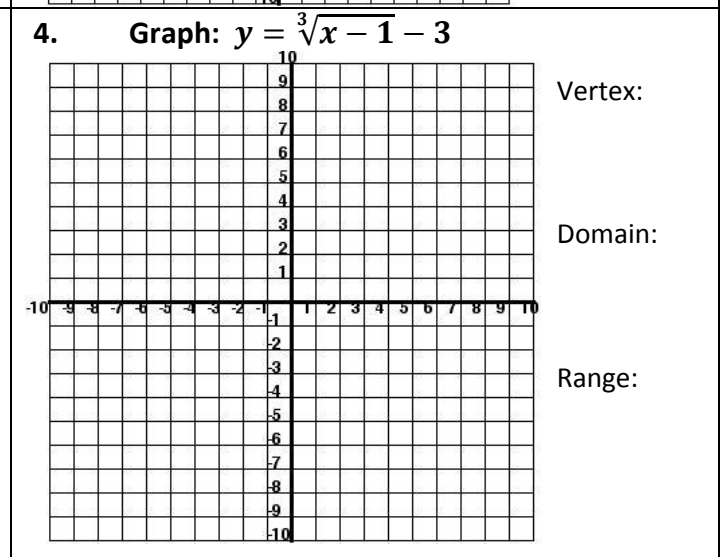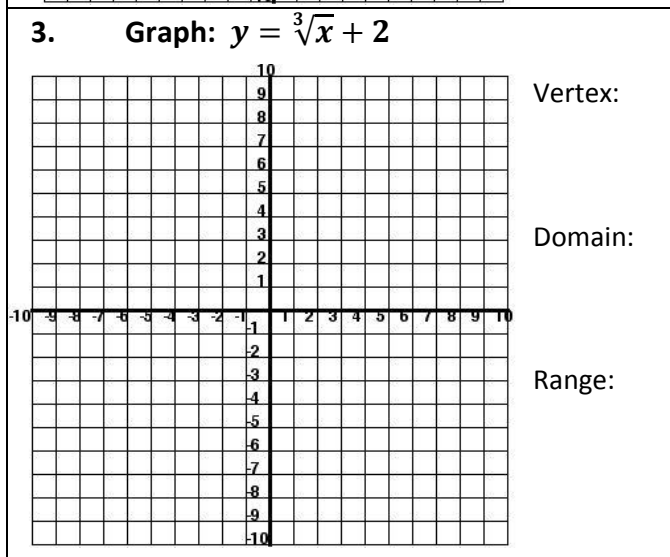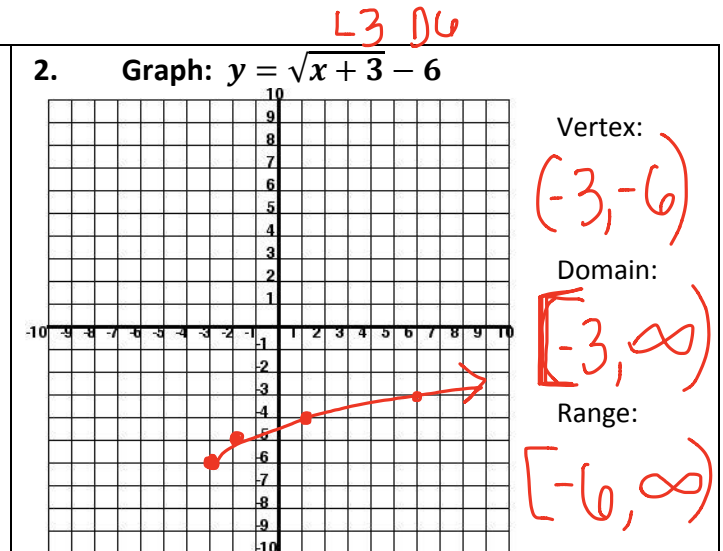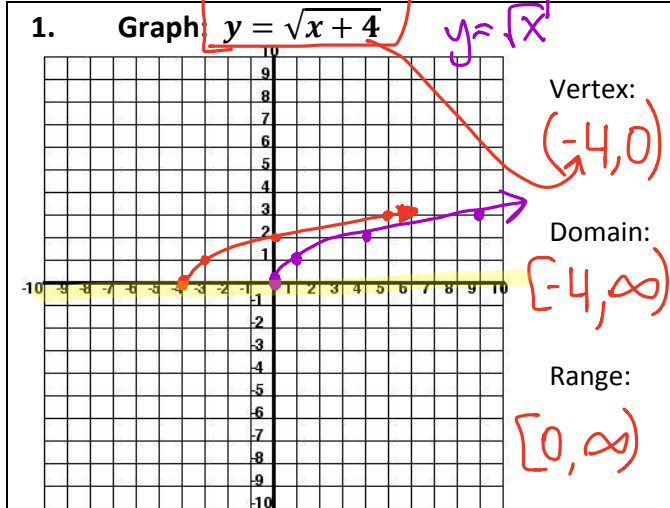
Domain:
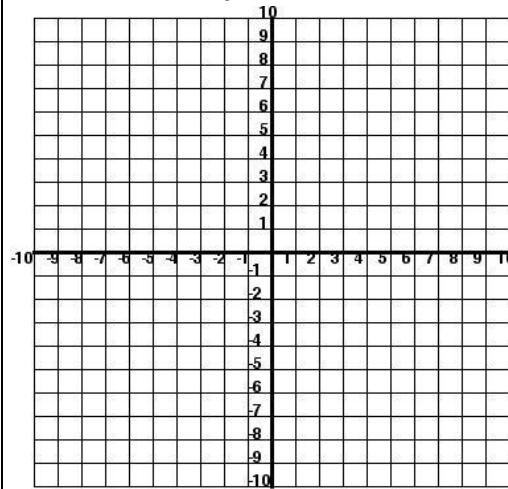
Range:

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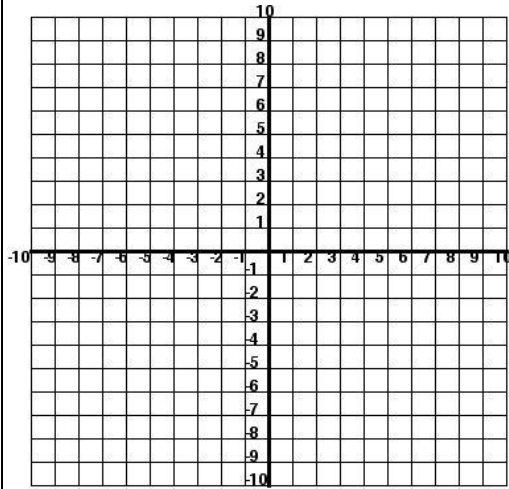
Vertex:

Domain:

Range:

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

Vertex:

Domain:

Range:

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

$y =$

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

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

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