

Unit 4 Lesson 2

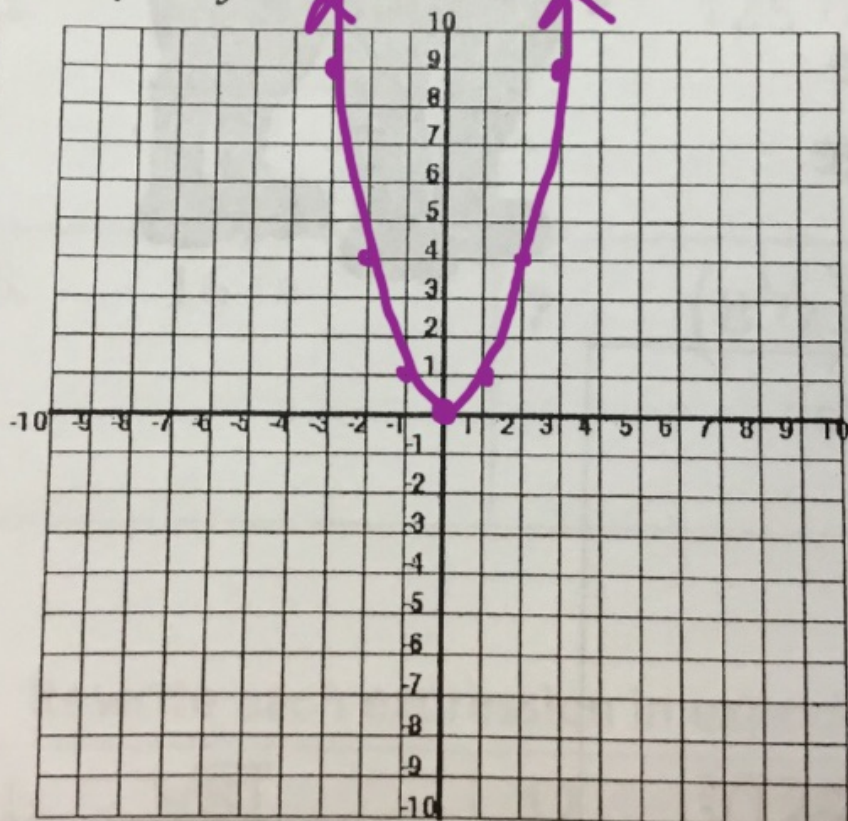
Square + Cube Root Graphs

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➤ Graphs of the Parent Functions:

Graph: $y = x^2$



Vertex:

$(0, 0)$

Domain:

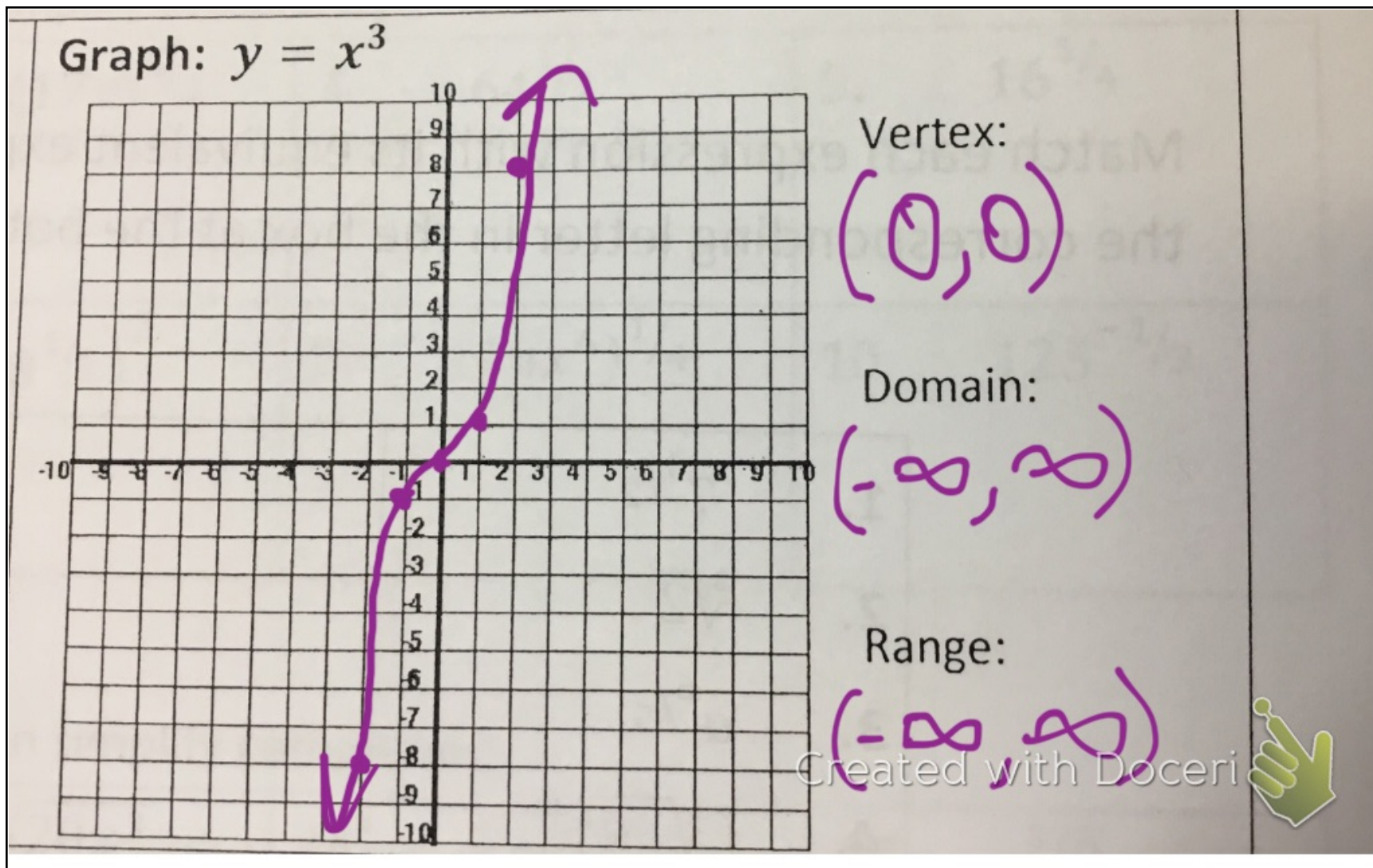
$(-\infty, \infty)$

Range:

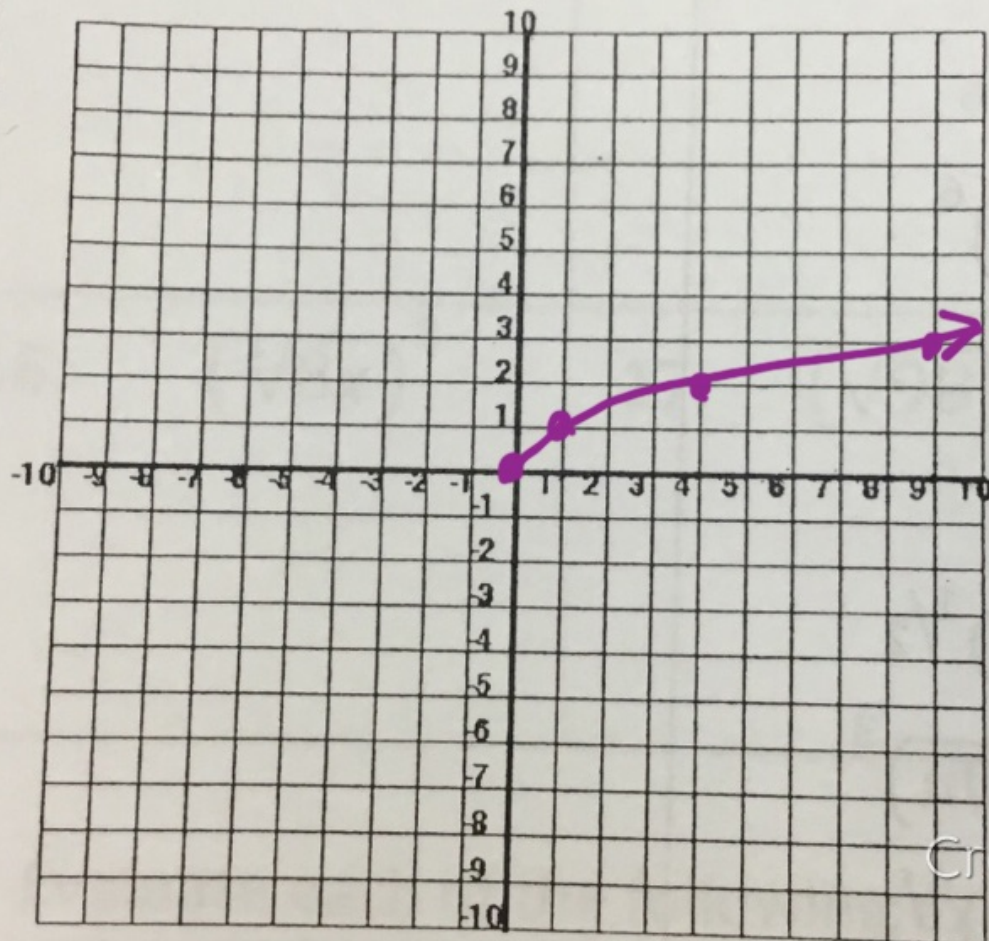
$[0, \infty)$

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Graph: $y = \sqrt{x}$



Vertex:

$(0,0)$

Domain:

$[0, \infty)$

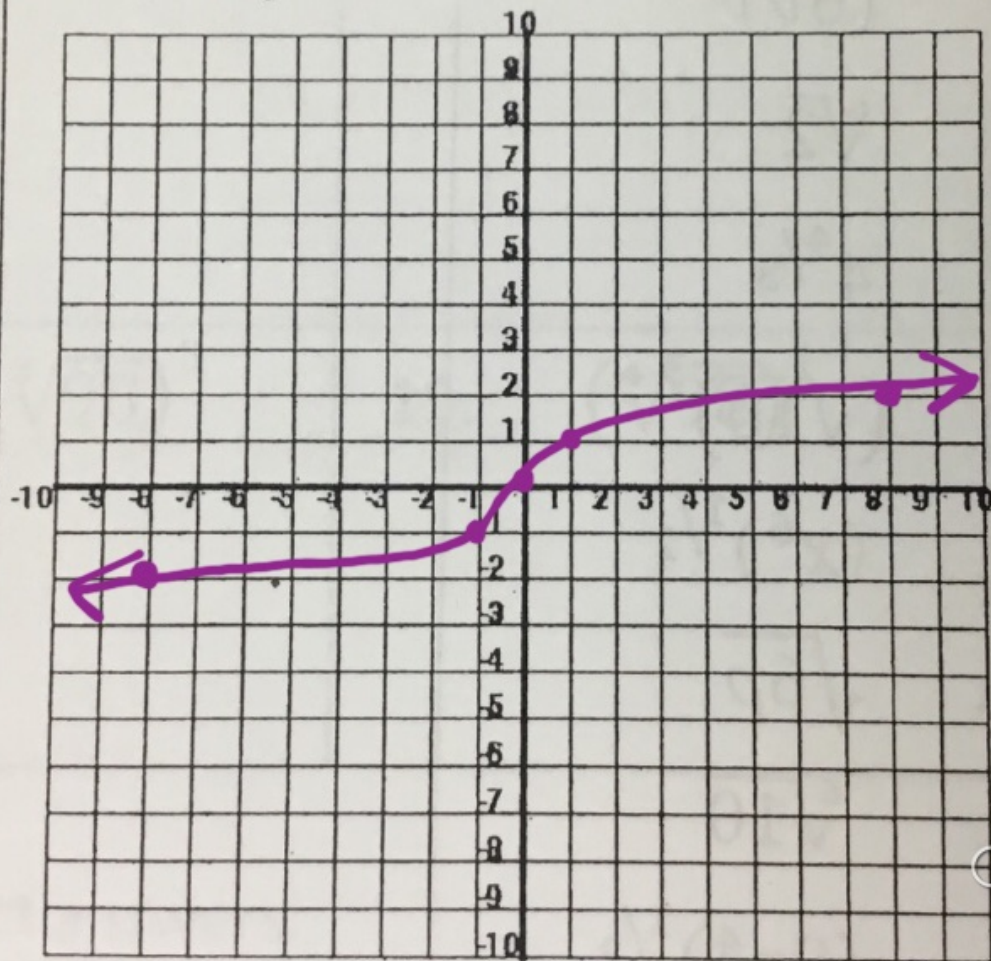
Range:

$[0, \infty)$

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



Vertex:

$(0, 0)$

Domain:

$(-\infty, \infty)$

Range:

$(-\infty, \infty)$

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

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)

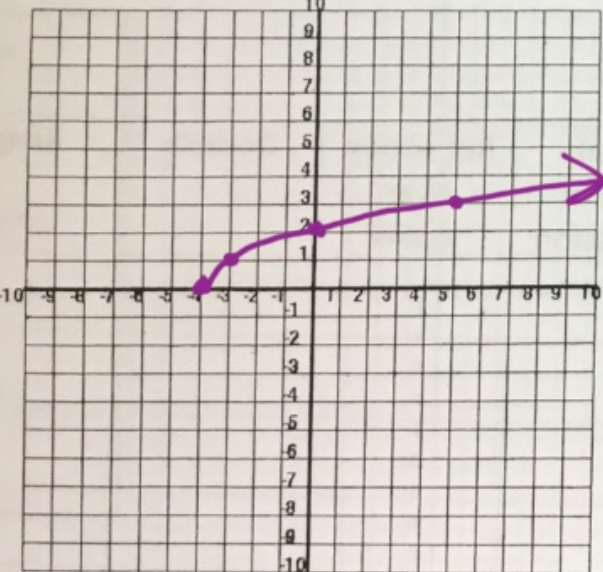
| Quadratic Function | Shift Left or Right | Shift Up or Down |
|------------------------|------------------------|---------------------|
| $y = (x - 3)^2 + 6$ | R3 | U6 |
| $y = (x + 1)^2$ | L1 | U4 |
| $y = x^2 - 4$ | L3 | D4 |
| Square Root Function | Shift Left or Right | Shift Up or Down |
| $y = \sqrt{x - 2} + 5$ | R2 | U5 |
| $y = \sqrt{x} - 1$ | L3 | D1 |
| $y = \sqrt{x + 3}$ | L3 | U4 |

| Cubic Function | Shift Left or Right | Shift Up or Down |
|---------------------------|------------------------|---------------------|
| $y = (x + 2)^3 - 5$ | L2 | D5 |
| $y = x^3 + 7$ | L3 | U7 |
| $y = (x - 8)^3$ | R8 | U4 |
| Cube Root Function | Shift Left or Right | Shift Up or Down |
| $y = \sqrt[3]{x} - 9$ | L3 | D9 |
| $y = \sqrt[3]{x + 2} + 4$ | L2 | U4 |
| $y = \sqrt[3]{x - 8}$ | R8 | U4 |

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Graph using Transformation Rules:

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

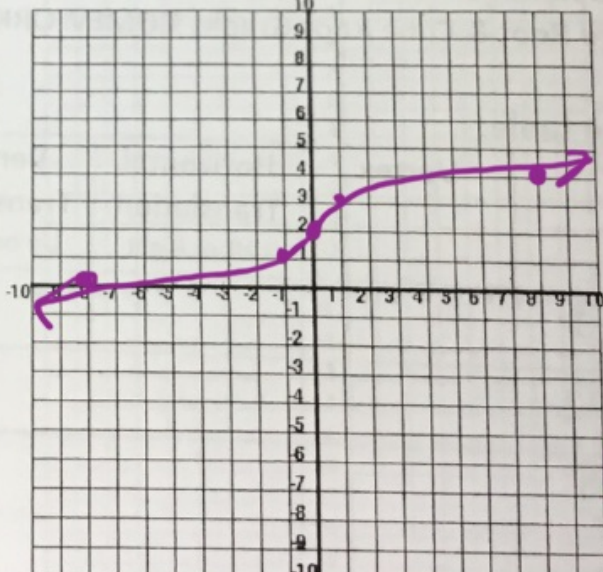


Vertex: $(-4, 0)$

Domain: $[-4, \infty)$

Range: $[0, \infty)$


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

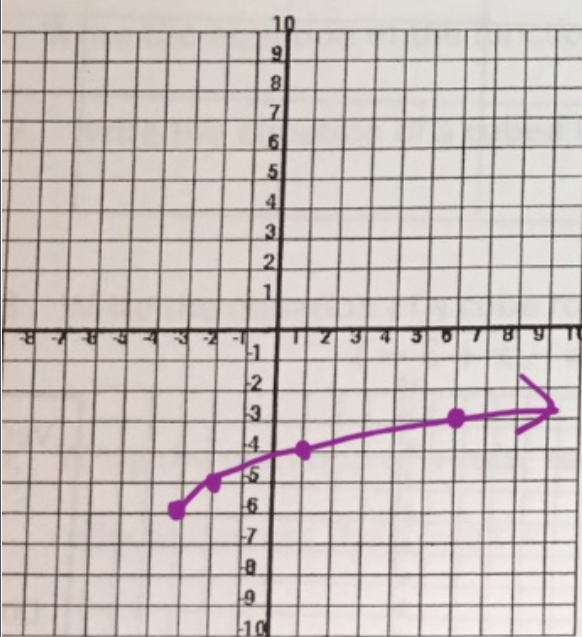
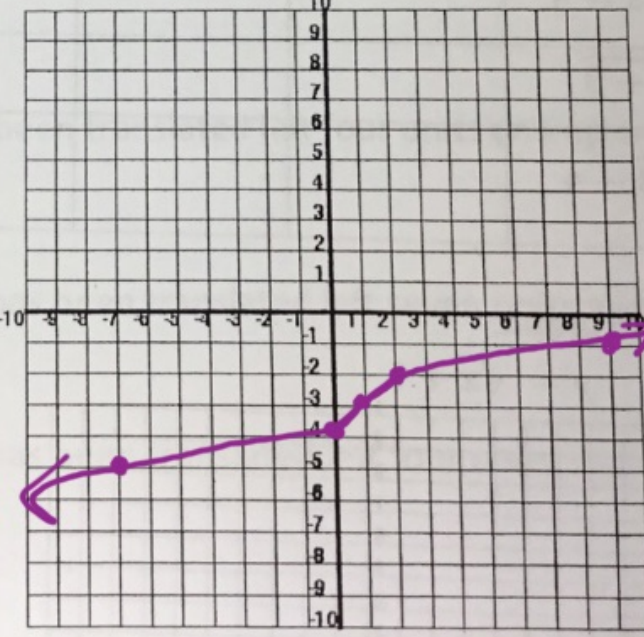



Vertex: $(0, 2)$

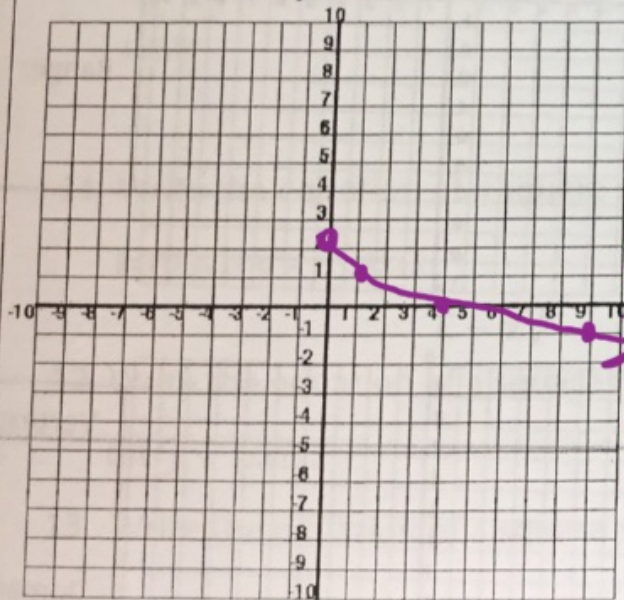
Domain: $(-\infty, \infty)$

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

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| | |
|---|--|
| <p>Graph: $y = \sqrt{x + 3} - 6$</p>  <p>Vertex: $(-3, -6)$</p> <p>Domain: $[-3, \infty)$</p> <p>Range: $[-6, \infty)$</p> | <p>4. Graph: $y = \sqrt[3]{x - 1} - 3$</p>  <p>Vertex: $(1, -3)$</p> <p>Domain: $(-\infty, \infty)$</p> <p>Range: $(-\infty, \infty)$</p> |
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5. Graph: $y = -\sqrt{x} + 2$

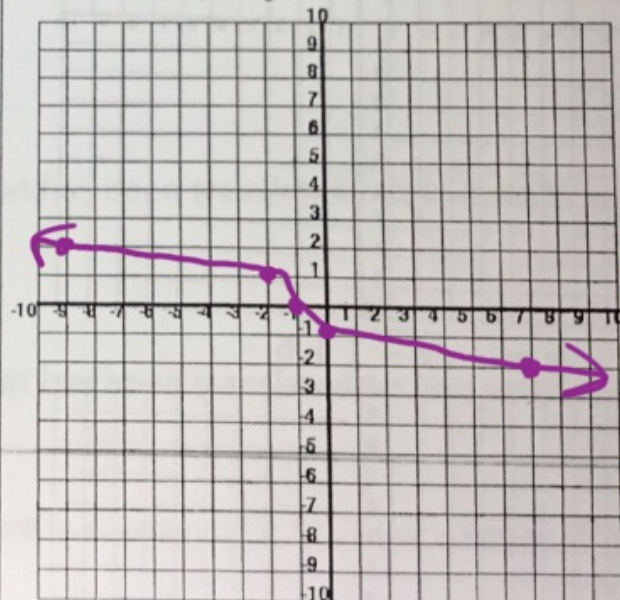


Vertex:
 $(0, 2)$

Domain:
 $[0, \infty)$

Range:
 $(-\infty, 2]$

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



Vertex:
 $(-1, 0)$

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

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

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

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

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

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

10. Write the equation of a square root function with a domain of $x \leq -1$ and a range of $y \geq 2$.

$$(-\infty, -1]$$

$$[2, \infty)$$

6

$$8) y = \sqrt[3]{x+3} - 2$$


$$9) y = -\sqrt{x-4}$$

$$10) y = \sqrt{-x-1} + 2$$

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HW: 7-8 in class practice

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A large rectangular area with a black border, containing horizontal blue lines for writing. The lines are evenly spaced and extend across the width of the box. In the bottom right corner of this area, there is a watermark that reads "Created with Doceri" in a light gray font, followed by a green hand icon with the index finger pointing upwards.