

Take note

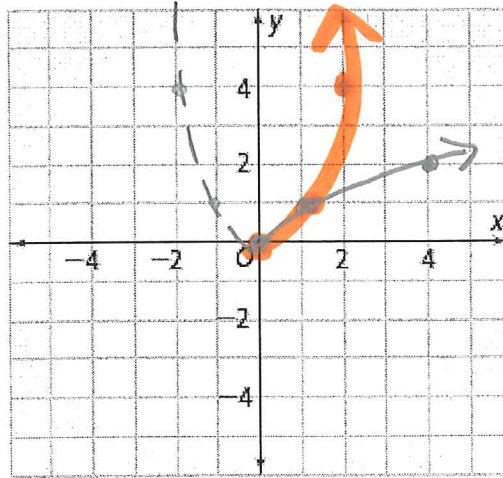
## Key Concepts Families of Radical Functions

|   | Square Root          | Radical                 |
|---|----------------------|-------------------------|
| Parent function   | $y = \sqrt{x}$       | $y = \sqrt[3]{x}$       |
| Reflection in x-axis                                      | $y = -\sqrt{x}$      | $y = -\sqrt[3]{x}$      |
| Stretch ( $a > 1$ ), shrink ( $0 < a < 1$ ) by factor $a$ | $y = a\sqrt{x}$      | $y = a\sqrt[3]{x}$      |
| Translation: horizontal by $h$ , vertical by $k$          | $y = \sqrt{x-h} + k$ | $y = \sqrt[3]{x-h} + k$ |

Graph the parent function:  $f(x) = \sqrt{x}$

| X | Y |
|---|---|
| 0 | 0 |
| 1 | 1 |
| 4 | 2 |

Domain:  $x \geq 0$   
Range:  $y \geq 0$



Inverse:  $y = \sqrt{x}$   
 $(x)^2 = (\sqrt{y})^2$   
 $x^2 = y$   
 $f^{-1}(x) = x^2$   
Domain:  $x \geq 0$   
Range:  $y \geq 0$

Graph the inverse.

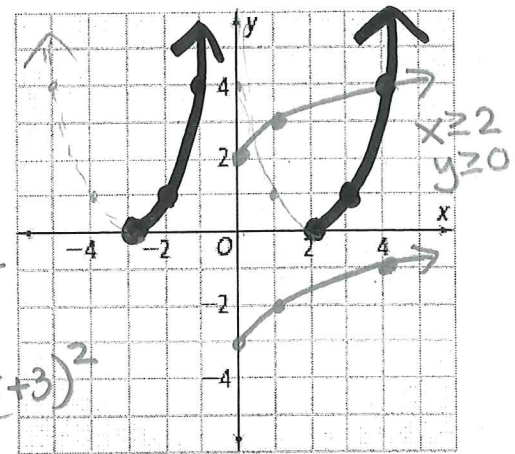
### Problem 1 Translating a Square Root Function Vertically

Got It? What are the graphs of  $y = \sqrt{x+2}$  and  $y = \sqrt{x-3}$ ?

7. The graph of  $y = \sqrt{x+2}$  is a horizontal / vertical translation of  $y = \sqrt{x}$   
up / down / left / right 2 units.

8. What does the translation  $y = \sqrt{x-3}$  look like?

9. Draw the graph of the function  $y = \sqrt{x}$ .  
Then, use that graph to draw the graphs of  $y = \sqrt{x+2}$  and  $y = \sqrt{x-3}$  on the same grid.



$y = \sqrt{x-3}$   
 $x = \sqrt{y+3}$   
 $(x+3)^2 = (\sqrt{y})^2$   
 $(x+3)^2 = y$   
 $f^{-1}(x) = (x+3)^2$   
 $y = \sqrt{x-3}$

|                    |                    |                    |                     |
|--------------------|--------------------|--------------------|---------------------|
| Domain: $x \geq 0$ | Domain: $x \geq 2$ | Domain: $x \geq 0$ | Domain: $x \geq -3$ |
| Range: $y \geq 0$  | Range: $y \geq 0$  | Range: $y \geq -3$ | Range: $y \geq 0$   |

$y = \sqrt{x+2}$   
 $x = \sqrt{y+2}$   
 $(x-2)^2 = (\sqrt{y})^2$   
 $(x-2)^2 = y$   
 $y = (x-2)^2$



### Problem 2 Translating a Square Root Function Horizontally

Got It? What are the graphs of  $y = \sqrt{x-3}$  and  $y = \sqrt{x+2}$ ?

10. The graph of  $y = \sqrt{x-3}$  is a horizontal / vertical translation of  $y = \sqrt{x}$  up / down / left / right 3 units.
11. What does the translation  $y = \sqrt{x+2}$  look like?

$$y = \sqrt{x+2}$$

$$x = \sqrt{y+2}$$

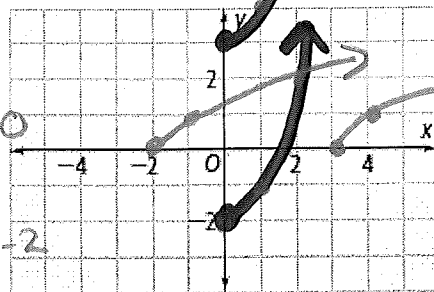
$$x^2 = y+2$$

$$x^2 - 2 = y$$

$$f^{-1}(x) = x^2 + 3$$

12. Draw the graph of the function  $y = \sqrt{x}$ . Then, use that graph to draw the graphs of  $y = \sqrt{x-3}$  and  $y = \sqrt{x+2}$  on the same grid.

|                    |            |                     |             |
|--------------------|------------|---------------------|-------------|
| Domain: $x \geq 3$ | $x \geq 0$ | Domain: $x \geq -2$ | $x \geq 0$  |
| Range: $y \geq 0$  | $y \geq 3$ | Range: $y \geq 0$   | $y \geq -2$ |



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

$$x^2 = y-3$$

$$x^2 + 3 = y$$

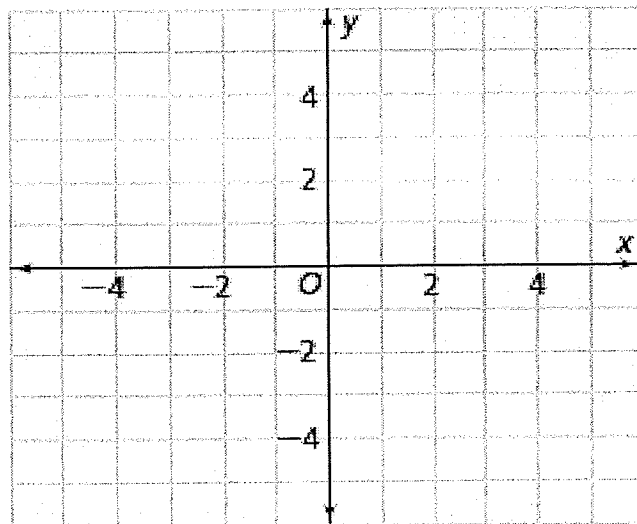


### Problem 3 Graphing a Square Root Function

Got It? What is the graph of  $y = 3\sqrt{x+2} - 4$ ?

13. Complete the table.

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14. Multiplying the y-coordinates of  $y = \sqrt{x}$  by 3 shrinks / stretches the graph.

15. Explain how the graph of  $y = 3\sqrt{x+2} - 4$  relates to the graph of  $y = \sqrt{x}$ .

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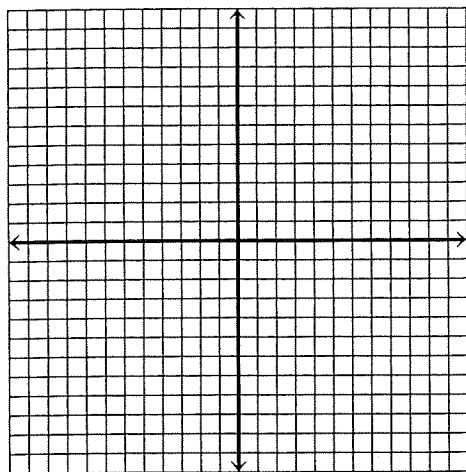
# Algebra 2 6-8 Worksheet

Name: \_\_\_\_\_

Date: \_\_\_\_\_ Hour: \_\_\_\_\_

Graph each function using transformation:

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

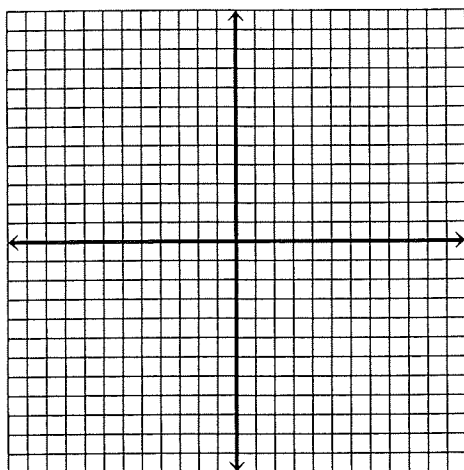


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Domain:

Range:

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

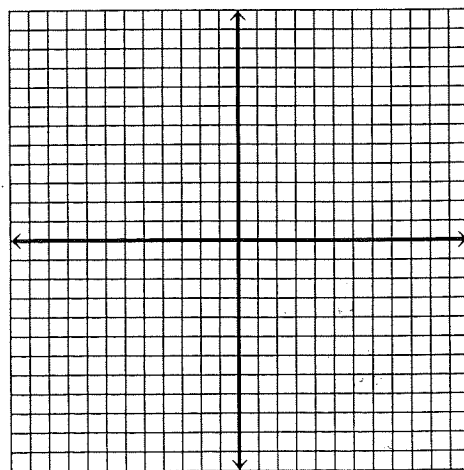


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Domain:

Range:

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



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Domain:

Range: