

Chapter 2.5 - Transformations

DAY 5

Vertical and Horizontal Shifts:

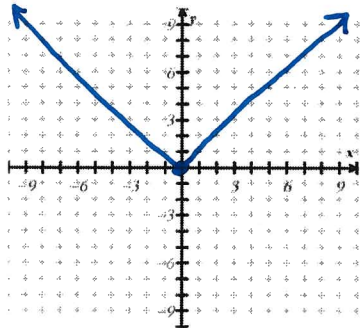
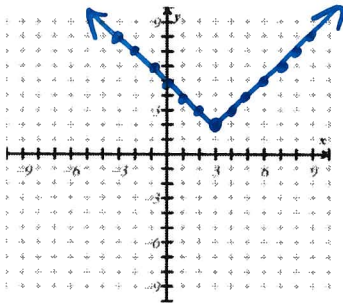
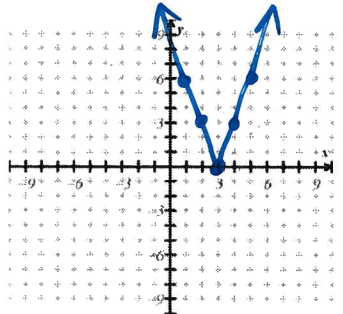
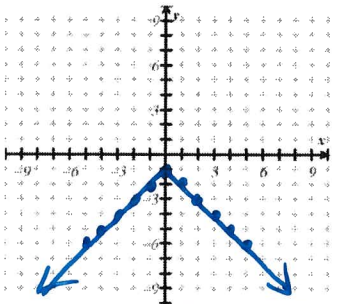
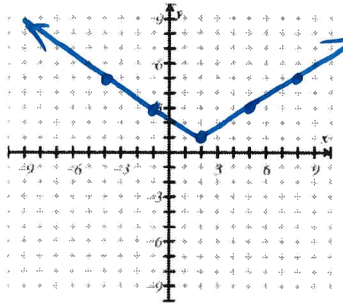
- Horizontal shift **right** h units: $y = f(x - h)$
- Horizontal shift **left** h units: $y = f(x + h)$
- Vertical shift **upward** k units: $y = f(x) + k$
- Vertical shift **downward** k units: $y = f(x) - k$

Reflections in the Coordinate Axes:

- Reflection in the x-axis: $y = -f(x)$
- Reflection in the y-axis: $y = f(-x)$

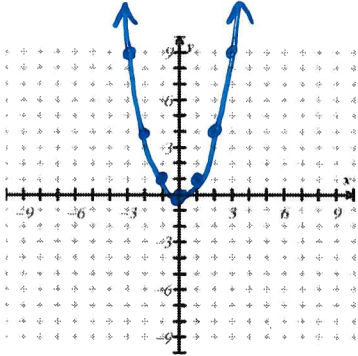
Non-rigid Transformations: transformations are those that cause a distortion – a change in the shape of the original graph.

- A **vertical stretch** in $y = af(x)$ if $a > 1$
- A **vertical shrink (or compression)** in $y = af(x)$ if $0 < a < 1$

<p>Absolute Value Functions</p> <p>Parent Function: $y = x$</p>  <p>$\pm a$ is the slope</p>	<p>1. $y = x - 3 + 2$</p> <p><i>R3 u2</i> <i>(3, 2)</i></p> 	<p>2. $y = 3 x - 3$</p> <p><i>R3</i></p> 
	<p>3. $y = - x - 1$</p> <p><i>D1</i> <i>(0, -1)</i></p> 	<p>4. $y = \frac{2}{3} x - 2 + 1$</p> <p><i>R2 u1</i></p> 

Quadratic Functions

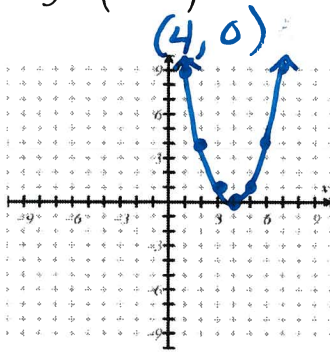
Parent Function: $y = x^2$



1 1
2 4
3 9

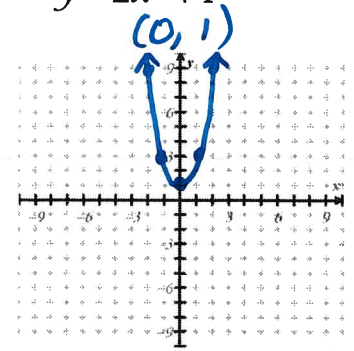
R4

1. $y = (x-4)^2$



u1

2. $y = 2x^2 + 1$

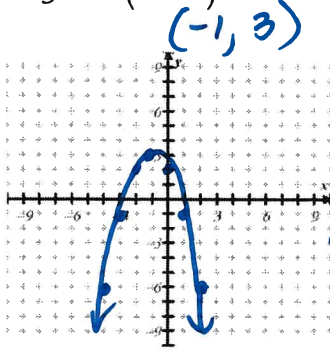


1 x 2
2 4 8
3 9 18

L1

u3

3. $y = -(x+1)^2 + 3$

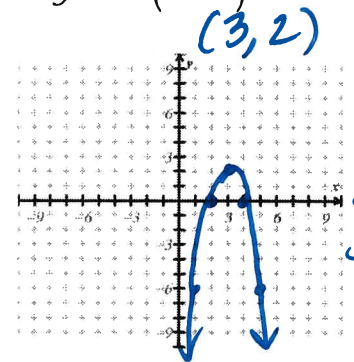


1 -1
2 -4
3 -9

R3

u2

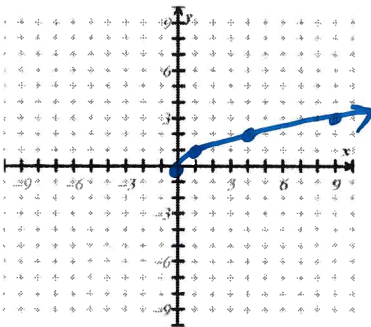
4. $y = -2(x-3)^2 + 2$



1 x -2
2 4 -8
3 9 -18

Square Root Functions

Parent Function: $y = \sqrt{x}$

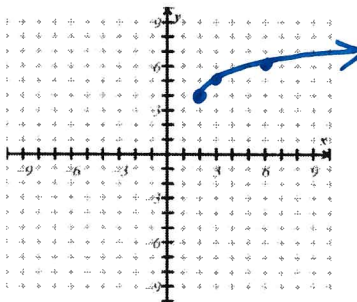


1 1
4 2
9 3

R2

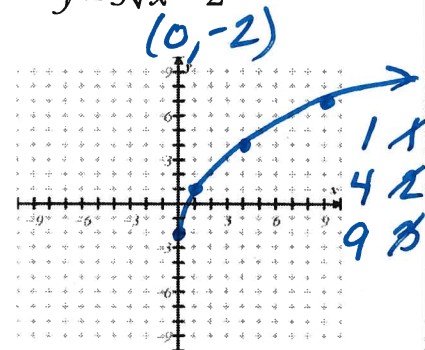
u4

1. $y = \sqrt{x-2} + 4$



D2

2. $y = 3\sqrt{x-2}$

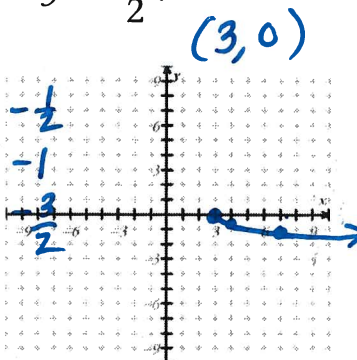


1 x 3
4 2 6
9 3 9

R3

u3

3. $y = -\frac{1}{2}\sqrt{x-3}$

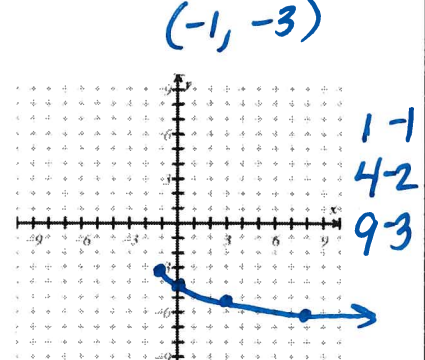


1 x -1/2
4 2 -1
9 3 -3/2

L1

D3

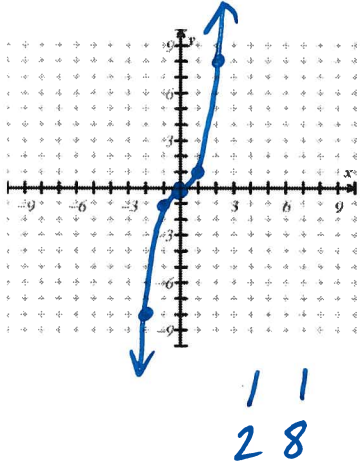
4. $y = -\sqrt{x+1} - 3$



1 -1
4 -2
9 -3

Cube Functions

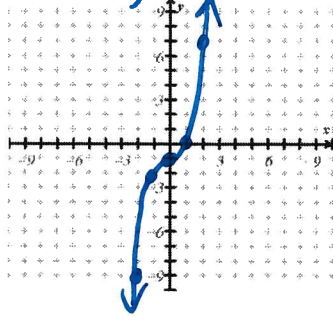
Parent Function: $y = x^3$



1.

$$y = x^3 - 1$$

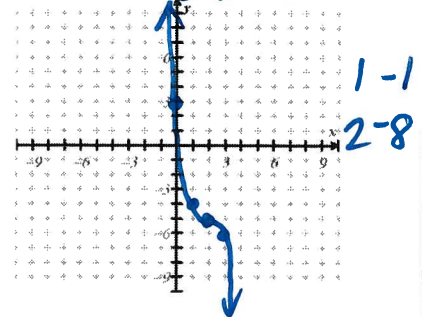
$(0, -1)$



2.

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

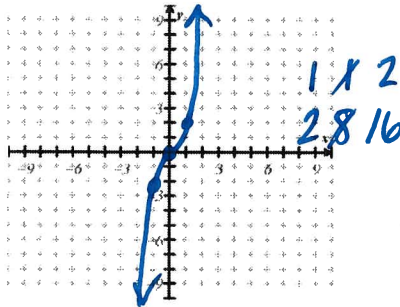
$(2, -5)$



3.

$$y = 2x^3$$

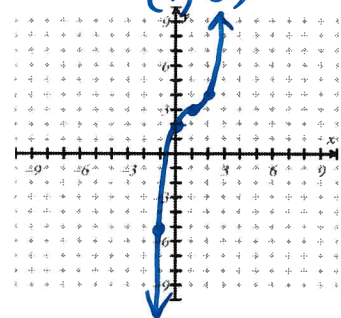
$(0, 0)$



4.

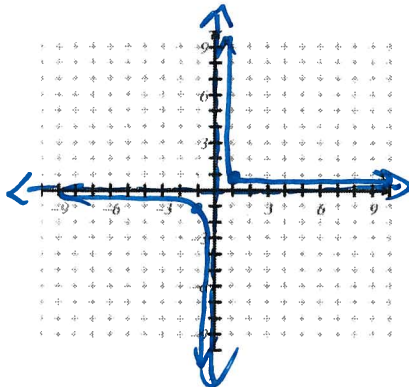
$$y = (x-1)^3 + 3$$

$(1, 3)$



Reciprocal Functions

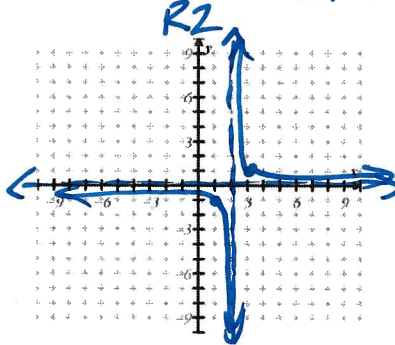
Parent Function: $y = \frac{1}{x}$



1.

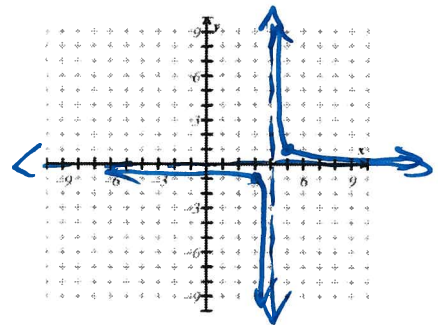
$$y = \frac{1}{x-2}$$

$x-2 \neq 0$
 $x \neq 2$



2.

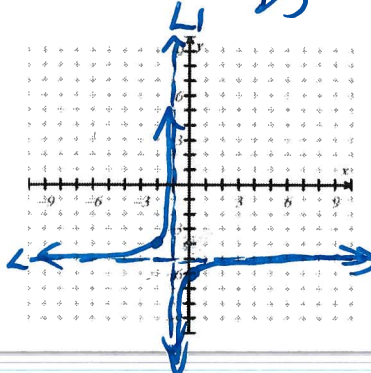
$$y = \frac{1}{x} + 4$$



3.

$$y = -\frac{1}{x+1} - 5$$

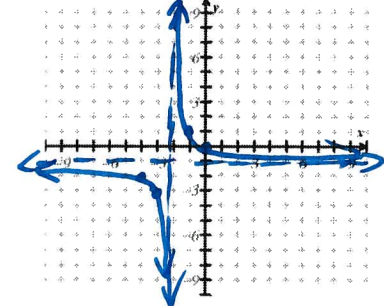
$D5$



4.

$$y = \frac{2}{x+2} - 1$$

$L2 D1$



Match each function to the correct graph.

1. $y = x^2 + 2$ B

5. $y = -x^2 + 2$ G

2. $y = -2|x|$ E

6. $y = -(x+2)^2$ C

3. $y = (x-1)^3$ A

7. $y = |x| + 2$ D

4. $y = (x+2)^3 + 1$ F

8. $y = |x-2|$ H

