

# Chapter 2.5 - Transformations

# DAY 5

## Vertical and Horizontal Shifts:

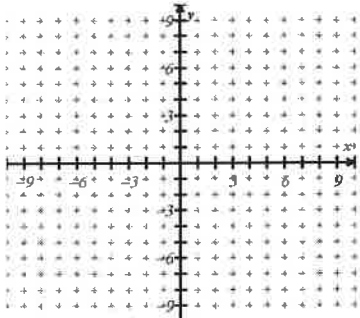
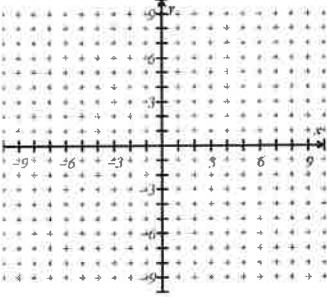
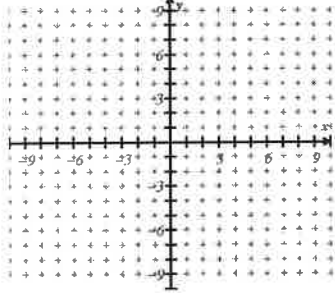
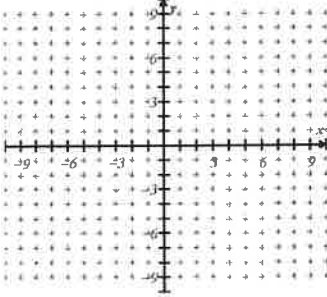
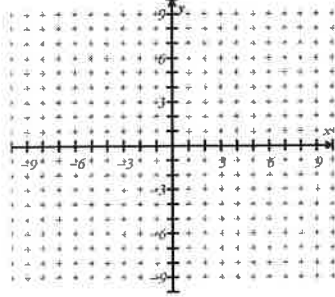
- Horizontal shift **right**  $h$  units:  $y = f(x - h)$
- Horizontal shift **left**  $h$  units:  $y = f(x + h)$
- Vertical shift **upward**  $k$  units:  $y = f(x) + k$
- Vertical shift **downward**  $k$  units:  $y = f(x) - k$

## Reflections in the Coordinate Axes:

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

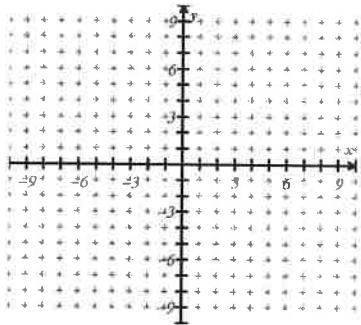
Non-rigid Transformations: transformations are those that cause a distortion – a change in the shape of the original graph.

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

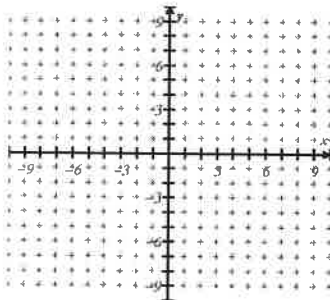
<p><b>Absolute Value Functions</b></p> <p>Parent Function: <math>y =  x </math></p>  <p><math>\pm a</math> is the slope</p>	<p>1. <math>y =  x - 3  + 2</math></p> 	<p>2. <math>y = 3 x - 3 </math></p> 
	<p>3. <math>y = - x  - 1</math></p> 	<p>4. <math>y = \frac{2}{3} x - 2  + 1</math></p> 

### Quadratic Functions

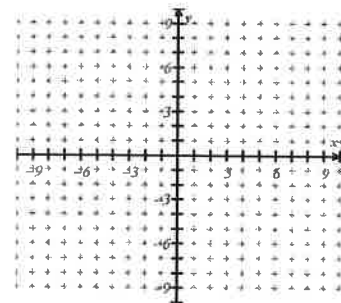
Parent Function:  $y = x^2$



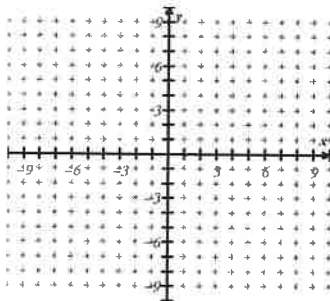
1.  $y = (x - 4)^2$



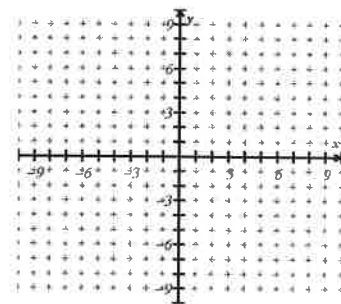
2.  $y = 2x^2 + 1$



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

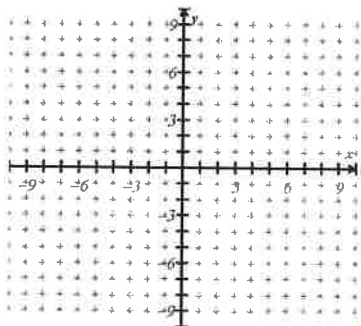


4.  $y = -2(x - 3)^2 + 2$

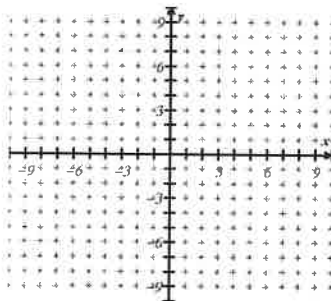


### Square Root Functions

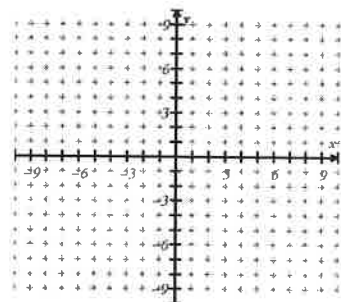
Parent Function:  $y = \sqrt{x}$



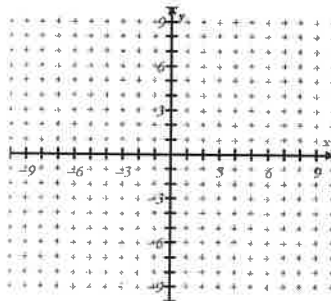
1.  $y = \sqrt{x - 2} + 4$



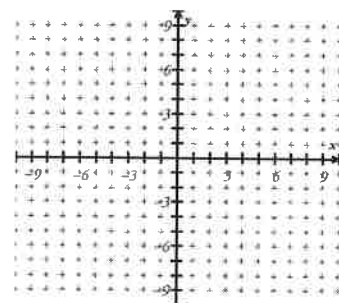
2.  $y = 3\sqrt{x} - 2$



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

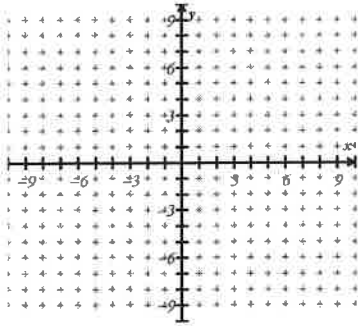


4.  $y = -\sqrt{x + 1} - 3$

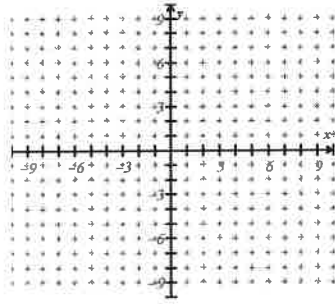


## Cube Functions

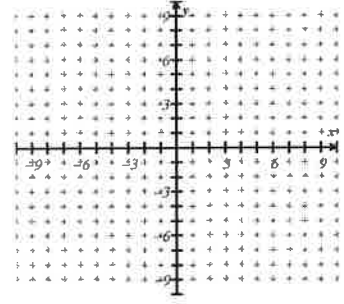
Parent Function:  $y = x^3$



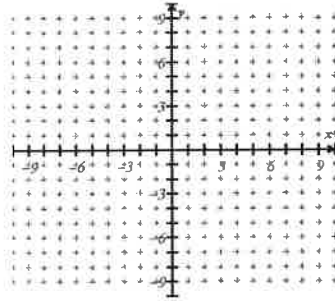
1.  $y = x^3 - 1$



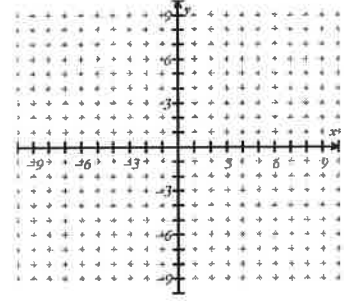
2.  $y = -(x - 2)^3 - 5$



3.  $y = 2x^3$

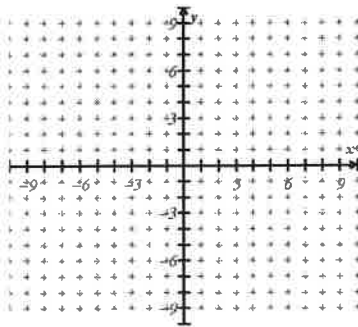


4.  $y = (x - 1)^3 + 3$

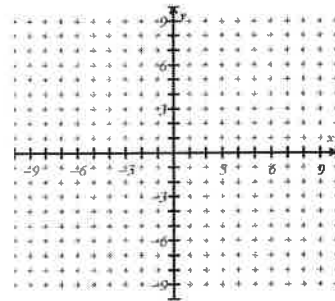


## Reciprocal Functions

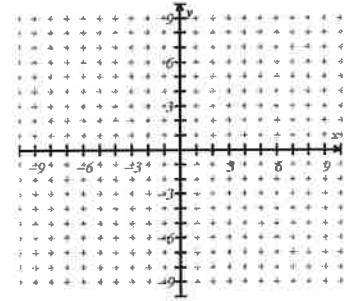
Parent Function:  $y = \frac{1}{x}$



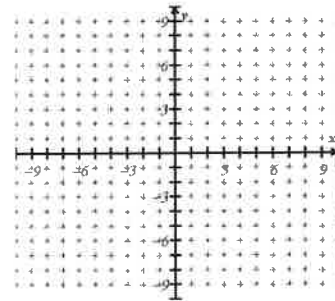
1.  $y = \frac{1}{x - 2}$



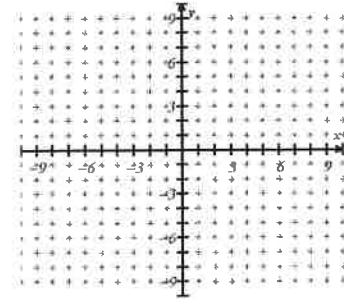
2.  $y = \frac{1}{x} + 4$



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



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



Match each function to the correct graph.

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

5.  $y = -x^2 + 2$  \_\_\_\_\_

2.  $y = -2|x|$  \_\_\_\_\_

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

3.  $y = (x-1)^3$  \_\_\_\_\_

7.  $y = |x| + 2$  \_\_\_\_\_

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

8.  $y = |x-2|$  \_\_\_\_\_

