Name: _____ Period: _____ Date: _____
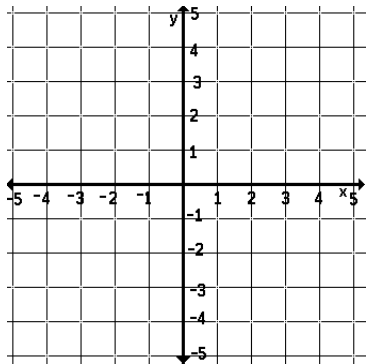
Math Lab: Transformations of Parent Graphs

Use your graphing calculator to sketch each graph as accurately as possible. Trace over each curve in red and identify each type of function.
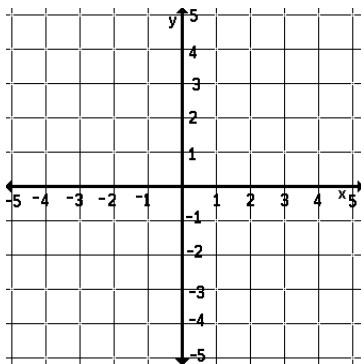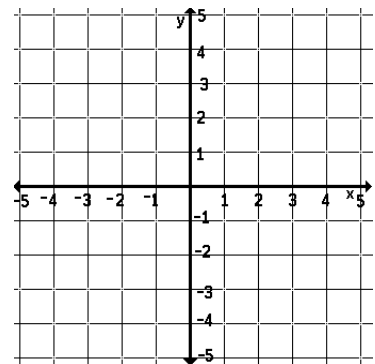
$f(x) = x$	$f(x) = x^2$	$f(x) = x^3$
Type of Function:	Type of Function:	Type of Function:
Domain:	Domain:	Domain:
Range:	Range:	Range:
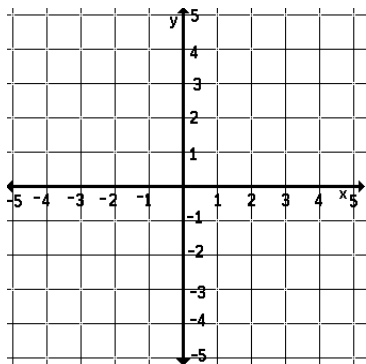
$f(x) = |x|$	$f(x) = \sqrt{x}$	$f(x) = 1/x$
Type of Function:	Type of Function:	Type of Function:
Domain:	Domain:	Domain:
Range:	Range:	Range:
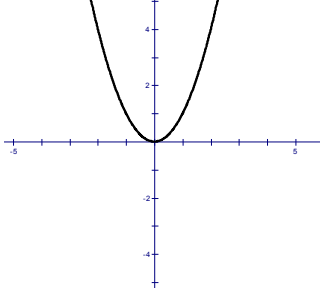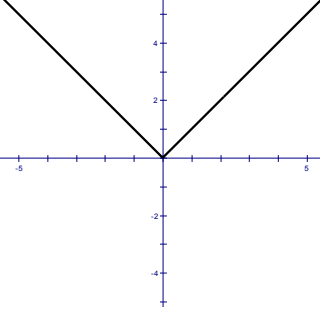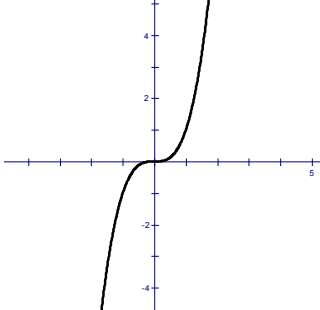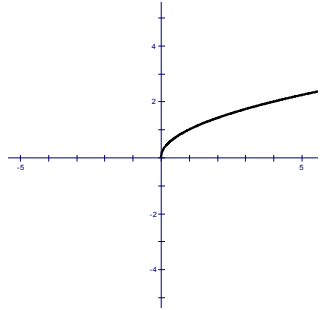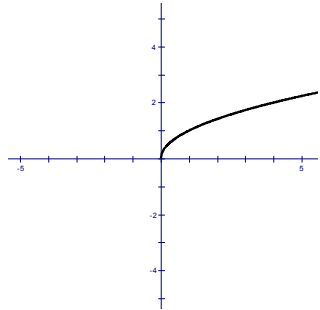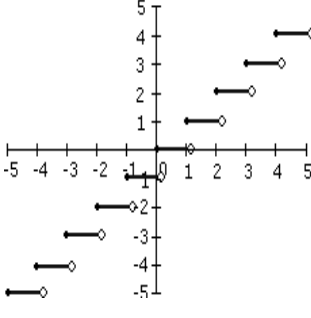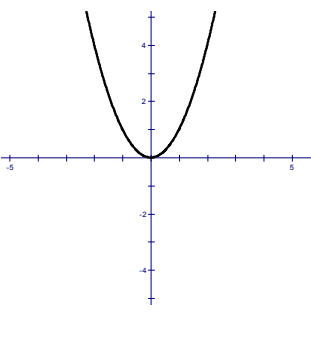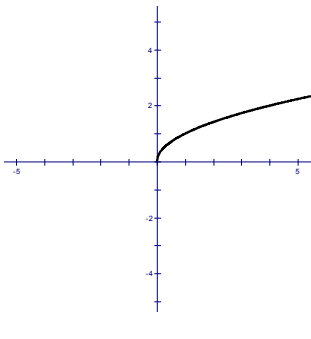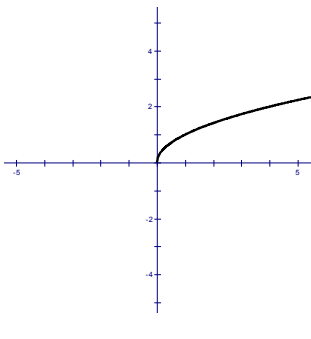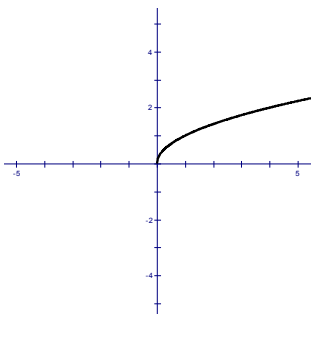
$f(x) = [\![x]\!]$	
Type of Function:	What do all of these parent graphs have in common?
Domain:	
Range:	
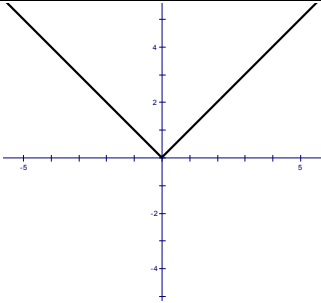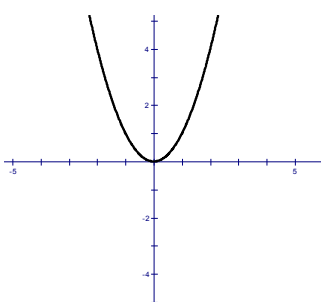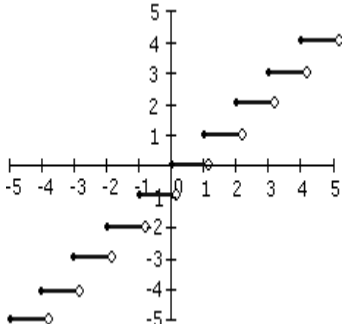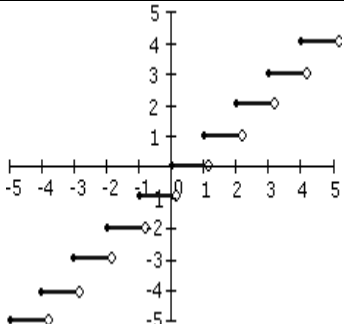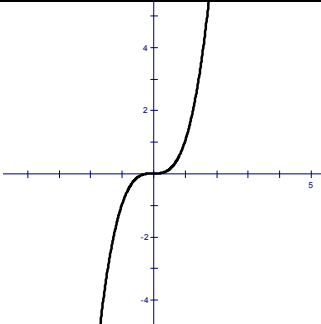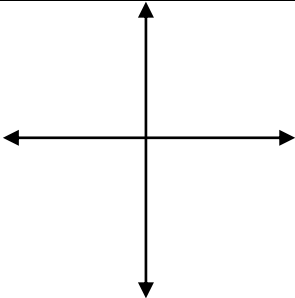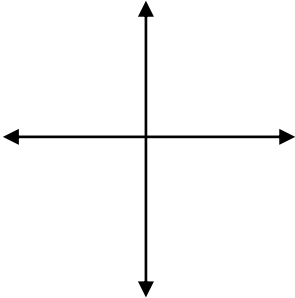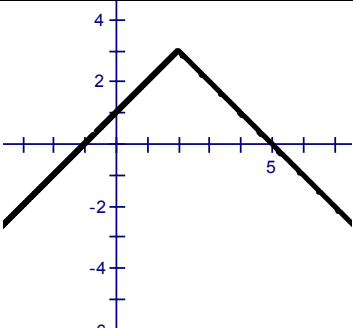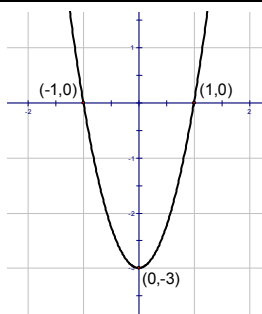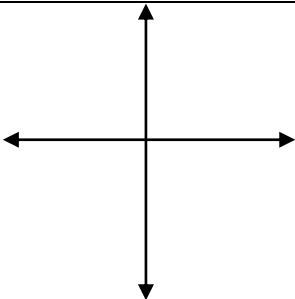
Equation of Parent Function	Description of Transformation	Equation of Transformed Function	Graph of Transformed Function (in red)	Domain and Range of Transformed Function
$f(x) = x^2$		$f(x) + 3 =$		
$f(x) = |x|$		$f(x) - 5 =$		
$f(x) = x^3$		$f(x - 4) =$		
$f(x) = \sqrt{x}$		$f(x + 5) =$		
$f(x) = \sqrt{x}$		$f(x + 3) - 4 =$		

Equation of Parent Function	Description of Transformation	Equation of Transformed Function	Graph of Transformed Function (in red)	Domain and Range of Transformed Function
$f(x) = [\![x]\!]$		$-f(x) =$	fx =x²	
$f(x) = x^2$		$-f(x) =$	fx = x	10
$f(x) = \sqrt{x}$		$-f(x) =$	fx = x	10
$f(x) = \sqrt{x}$		$f(-x) =$	fx = x	10
$f(x) = \sqrt{x}$		$-f(-x) =$		10

Equation of Parent Function	Description of Transformation	Equation of Transformed Function	Graph of Transformed Function (in red)	Domain and Range of Transformed Function
$f(x) = |x|$		$3 \cdot f(x) =$		
$f(x) = x^2$		$\frac{1}{2} \cdot f(x) =$		
$f(x) = [\![x]\!]$		$f(2x) =$		
$f(x) = [\![x]\!]$		$f\left(\frac{1}{3}x\right) =$		
$f(x) = x^3$		$6 \cdot f(x) =$		

Equation of Parent Function	Description of Transformation	Equation of Transformed Function	Graph of Transformed Function (in red)	Domain and Range of Transformed Function
$f(x) = \sqrt{x}$ f x = √x-2 +3				Domain $(-\infty, 3]$ Range $[2, \infty)$
		$f(x) = -(x-2)^3 - 4$	16 14 12 10 8 6	
-25 -20 -15		-10 -5	4 2 -2 -4	5 10 15 20
			f x = 3 x²-3 -8 (-1,0) -10 (1,0) -12 -14 -16 (0,-3)	
	A rational function has been translated up 4 units and 3 units to the right.			

Summarize

For each of the following, describe the transformation happening to the function.

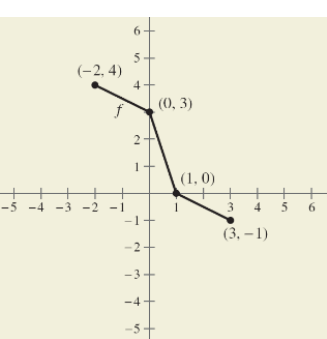| Rigid Transformations		Non-rigid Transformations	
Function Notation	Description of transformation	Function Notation	Description of transformation
$f(x) = f(x) + c$		$f(x) = c \cdot f(x)$	
$f(x) = f(x) - c$		$f(x) = \dfrac{1}{c} \cdot f(x)$	
$f(x) = f(x + c)$		$f(x) = f(cx)$	
$f(x) = f(x - c)$		$f(x) = f\left(\dfrac{1}{c}x\right)$	
$f(x) = -f(x)$			
$f(x) = f(-x)$			

Based on the tables, what is the difference between a rigid transformation and a non-rigid transformation?

Extend your thinking

Use the graph of f to sketch each graph. Label each ordered pair.

(Hint: Think about how the transformation affects the x and y-coordinate of each anchor point on the graph.)

1. $y = f(x) - 1$

2. $y = f(x - 1)$

3. $y = f(-x)$

4. $y = (x + 1)$

5. $y = -f(x - 2)$

6. $y = \dfrac{1}{2}f(x)$