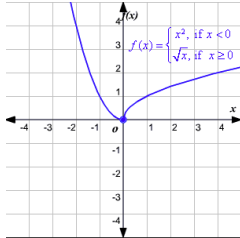


3.4 Piecewise Functions

↳ multiple function



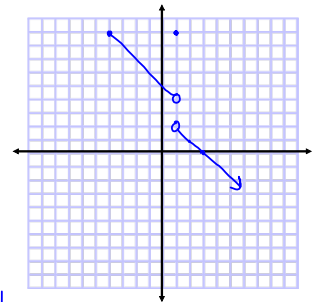
Parent Functions		
Constant:	$f(x) = a$	
Identity:	$f(x) = x$	
Absolute Value:	$f(x) = x $	
Reciprocal:	$f(x) = \frac{1}{x}$	
Quadratic:	$f(x) = x^2$	
Cubic:	$f(x) = x^3$	
Greatest Integer:	$f(x) = [x]$	
Square Root:	$f(x) = \sqrt{x}$	
Exponential:	$f(x) = a^x$	
Logarithmic:	$f(x) = \log_a x$	
Cube root:	$f(x) = \sqrt[3]{x}$	

$$f(x) = \begin{cases} x+5 & \text{if } -4 \leq x < 1 \\ 9 & x=1 \\ -x+3 & x > 1 \end{cases}$$

$f(b)$	$f(-2)$	$f(4)$	$f(1)$
$\begin{matrix} \uparrow \\ x \\ 0+5 \\ 5 \end{matrix}$	$-2+5$	-1	9
5	3		

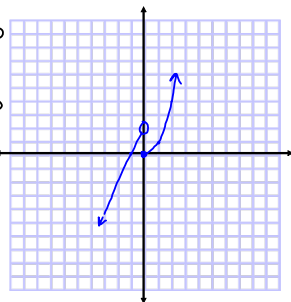
$$f(x) = \begin{cases} -x+5 & \text{if } -4 \leq x < 1 \\ 9 & x=1 \\ -x+3 & x > 1 \end{cases}$$

- Domain $[-4, \infty)$
- Intercepts $(0,5), (3,0)$
- Range $(-\infty, 2) \cup (4, 9]$
- Is f continuous on the Domain? **No**



$$f(x) = \begin{cases} 2+2x & \text{if } x < 0 \\ x^2 & \text{if } x \geq 0 \end{cases}$$

- Domain $(-\infty, \infty)$
- intercepts $(-1,0), (0,0)$
- Range $(-\infty, \infty)$
- Is f continuous? **No**



3.5 Transformations

$$y = f(x-2) \quad \text{Right 2}$$

$$y = f(-x) \quad \text{Reflects over y}$$

Remember

$$y = (x-2)^2 \text{ right 2} \quad y = -(x-2)^2 \text{ Reflects over x, right 2}$$

$$y = x^2 + 2 \text{ up 2} \quad y = (-x)^2 + 3 \text{ Reflects over y, up 3}$$

$$y = \sqrt{x} \quad \text{Write the function mwe down 8.}$$

$$y = \sqrt{x} - 8$$

Pick the correct equation for the graph.

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

Pick the correct equation for the graph.

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

Write the equation for the graph.

$f(x) = -|x+4| - 2$

$y = |x|$ Find the function - shifted right 8.

$y = |x-8|$

$y = \sqrt{x}$ (1) Reflect about the x-axis, (2) up 2, (3) Right $\frac{1}{5}$

$y = -\sqrt{x-5} + 2$

$y = \sqrt{x}$ (1) up 6 (2) Reflect over y-axis
 (3) " " x-axis

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

If $(-5, 1)$ is on $y = f(x)$, which point is on $y = \frac{1}{8}f(x)$

$(-\frac{5}{8}, 1)$ $(-\frac{5}{8}, \frac{1}{8})$ $(-5, \frac{1}{8})$ $(-5, 1)$

$y = f(x)$ x-intercepts are 4 and 7

(a) $y = f(x+6)$ x-int -2 1 ↓

(b) $y = f(x-3)$ x-int 7 10

(c) $y = 7f(x)$ x-int 4 7

(d) $y = f(-x)$ x-int -4 -7

Graph $g(x) = x^2 + 6$

Domain $(-\infty, \infty)$

Range $[6, \infty)$

Find the function that is finally graphed after the following transformations are applied to the graph of $y = \sqrt{x}$ in the order listed.

1. Shift up 6 units
2. Reflect about the x-axis
3. Reflect about the y-axis