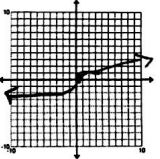
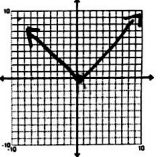
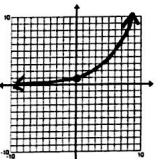


Parent Functions
Must Know These!
Must Be Able to Work with These Without a Calculator!!!



Function/Relation	Basic Equation	Intercepts	Extrema	Increasing/Decreasing Intervals	Positive/Negative Intervals	End Behavior	Symmetry	Domain and Range	Graph
1. Linear	$y = mx + b$ $y = x$	$(0,0)$	N/A	$\uparrow (-\infty, \infty)$	Pos: $(0, \infty)$ Neg: $(-\infty, 0)$	$x \rightarrow \infty, y \rightarrow \infty$ $x \rightarrow -\infty, y \rightarrow -\infty$	origin odd	D: \mathbb{R} R: \mathbb{R}	
2. Quadratic	$y = a(x-h)^2 + k$ $y = x^2$	$(0,0)$	min $(0,0)$	$\uparrow (0, \infty)$ $\downarrow (-\infty, 0)$	Pos: $(-\infty, 0) \cup (0, \infty)$	$\uparrow \uparrow$ $x \rightarrow -\infty, y \rightarrow \infty$ $x \rightarrow \infty, y \rightarrow \infty$	y-axis $x = 0$ Even	D: \mathbb{R} R: $[0, \infty)$	
3. Cubic	$y = a(x-h)^3 + k$ $y = x^3$	$(0,0)$	N/A	$\uparrow (-\infty, \infty)$	Pos: $(0, \infty)$ Neg: $(-\infty, 0)$	$\downarrow \uparrow$	origin odd	D: \mathbb{R} R: \mathbb{R}	
4. Square Root	$y = a\sqrt{x-h} + k$ $y = \sqrt{x}$ $y = x^{1/2}$	$(0,0)$	min $(0,0)$	$\uparrow (0, \infty)$	Pos: $(0, \infty)$	$x \rightarrow \infty, y \rightarrow \infty$ $x \rightarrow 0, y = 0$	N/A	D: $[0, \infty)$ R: $[0, \infty)$	
	$y = a(x-h)^{1/2} + k$								

Function/Relation	Basic Equation	Intercepts	Extrema	Increasing/Decreasing Intervals	Positive/Negative Intervals	End Behavior	Symmetry	Domain and Range	Graph
5. Cube Root $a\sqrt[3]{x-h} + k$	$y = \sqrt[3]{x}$ $y = x^{1/3}$	$(0,0)$	N/A	$\uparrow (-\infty, \infty)$	Pos: $(0, \infty)$ Neg: $(-\infty, 0)$	$\downarrow \uparrow$	origin	D: \mathbb{R} R: \mathbb{R}	
6. Absolute Value $a x-h + k$	$y = x $	$(0,0)$	min $(0,0)$	$\uparrow (0, \infty)$ $\downarrow (-\infty, 0)$	Pos: $(-\infty, 0) \cup (0, \infty)$	$\uparrow \uparrow$	Y-axis $x=0$	D: \mathbb{R} R: $[0, \infty)$	
7. Exponential $ae^{(x-h)} + k$	$y = e^x$	$(0,1)$	N/A	$\uparrow (-\infty, \infty)$	Pos: $(-\infty, \infty)$	$x \rightarrow -\infty$ $y \rightarrow 0$ $x \rightarrow \infty$ $y \rightarrow \infty$	N/A	D: \mathbb{R} R: $(0, \infty)$	
8. Rational $y = a\left(\frac{1}{x-h}\right) + k$	$y = \frac{1}{x}$	N/A	N/A	\downarrow $(-\infty, 0) \cup (0, \infty)$	Pos: $(0, \infty)$ Neg: $(-\infty, 0)$	$x \rightarrow \infty$ $y \rightarrow 0$ $x \rightarrow -\infty$ $y \rightarrow 0$	origin	D: $(-\infty, 0) \cup (0, \infty)$ R: $(-\infty, 0) \cup (0, \infty)$	