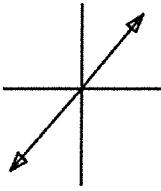
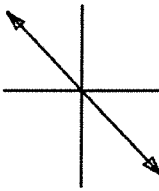
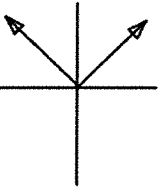
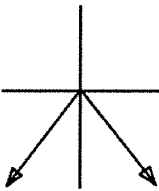
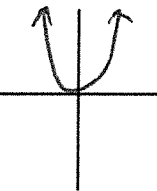
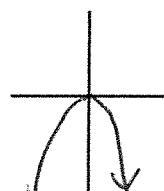
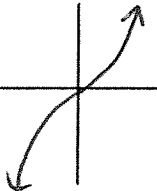
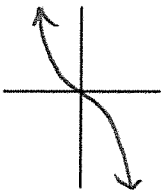
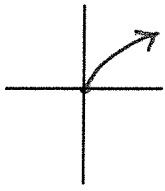
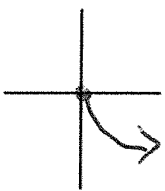
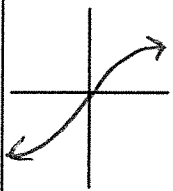
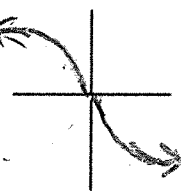


Family	Equation	Positive "a" Sketch	Negative "a" Sketch	Domain	Range	a + Description	a - Description
Linear	$y = ax$			$(-\infty, \infty)$	$(-\infty, \infty)$	$1-1$, odd $\uparrow (-\infty, \infty)$ $\downarrow -$ x-int = y-int = (0,0) As $x \rightarrow \infty$, $y \rightarrow \infty$ As $x \rightarrow -\infty$, $y \rightarrow -\infty$	$1-1$, odd $\downarrow (-\infty, \infty)$ x-int = y-int = (0,0) $\uparrow -$ As $x \rightarrow \infty$, $y \rightarrow -\infty$ As $x \rightarrow -\infty$, $y \rightarrow \infty$
Absolute Value	$y = a x $			$(-\infty, \infty)$	a + $[0, \infty)$	Many to 1 $\downarrow (-\infty, 0)$ $\uparrow (0, \infty)$ x-int = y-int = (0,0) As $x \rightarrow \infty$, $y \rightarrow \infty$ As $x \rightarrow -\infty$, $y \rightarrow \infty$ even	Many to 1 $\downarrow (0, \infty)$ $\uparrow (-\infty, 0)$ x-int = y-int = (0,0) As $x \rightarrow \infty$, $y \rightarrow -\infty$ As $x \rightarrow -\infty$, $y \rightarrow -\infty$ even
					a - $(-\infty, 0]$		

Family	Equation	Positive "a" Sketch	Negative "a" Sketch	Domain	Range	Description	
						a +	a -
Polynomial (neven)	$y = ax^n$			$(-\infty, \infty)$	a + $[0, \infty)$ a - $(-\infty, 0]$	Many to 1 $\downarrow (-\infty, 0)$ $\uparrow (0, \infty)$ x-int = y-int = (0,0) As $x \rightarrow \infty, y \rightarrow \infty$ As $x \rightarrow -\infty, y \rightarrow \infty$ <i>even</i>	Many to 1 $\uparrow (-\infty, 0)$ $\downarrow (0, \infty)$ x-int = y-int = (0,0) As $x \rightarrow \infty, y \rightarrow -\infty$ As $x \rightarrow -\infty, y \rightarrow -\infty$ <i>even</i>
Polynomial (nodd)	$y = ax^n$			$(-\infty, \infty)$	$(-\infty, \infty)$	1 - 1 $\downarrow -$ $\uparrow (-\infty, \infty)$ x-int = y-int = (0,0) As $x \rightarrow \infty, y \rightarrow \infty$ As $x \rightarrow -\infty, y \rightarrow -\infty$ <i>odd</i>	1 - 1 $\uparrow -$ $\downarrow (-\infty, \infty)$ x-int = y-int = (0,0) As $x \rightarrow \infty, y \rightarrow -\infty$ As $x \rightarrow -\infty, y \rightarrow \infty$ <i>odd</i>

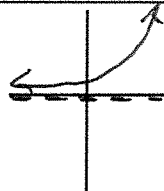
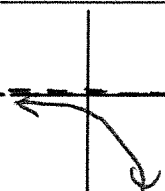
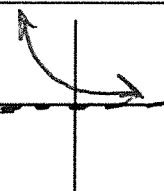
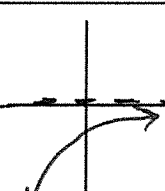
Family	Equation	Positive "a" Sketch	Negative "a" Sketch	Domain	Range	Description	
Radical (n even)	$y = a\sqrt[n]{x}$			$[0, \infty)$	a + $[0, \infty)$	1 - 1 Neither $\uparrow (0, \infty) \downarrow -$ x-int = y-int = (0,0)	1 - 1 Neither $\downarrow (0, \infty) \uparrow -$ x-int = y-int = (0,0)
					a - $(-\infty, 0]$	As $x \rightarrow \infty, y \rightarrow \infty$ As $x \rightarrow \ominus, y \rightarrow 0$	As $x \rightarrow \infty, y \rightarrow -\infty$ As $x \rightarrow \ominus, y \rightarrow 0$
Radical (n odd)	$y = a\sqrt[n]{x}$			$(-\infty, \infty)$	$(-\infty, \infty)$	1 - 1 $\downarrow -$ $\uparrow (-\infty, \infty)$ x-int = y-int = (0,0) As $x \rightarrow \infty, y \rightarrow \infty$ As $x \rightarrow -\infty, y \rightarrow -\infty$ odd	1 - 1 $\uparrow -$ $\downarrow (-\infty, \infty)$ x-int = y-int = (0,0) As $x \rightarrow \infty, y \rightarrow -\infty$ As $x \rightarrow -\infty, y \rightarrow \infty$ odd

Radical Even is half a sideways parabola

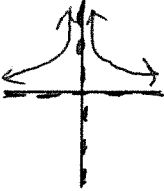
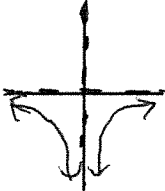
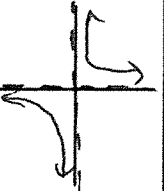
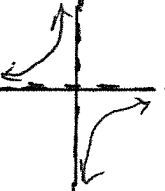
Radical Odd is polynomial odd on its side

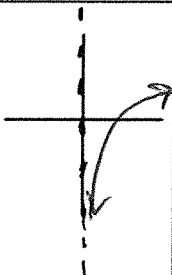
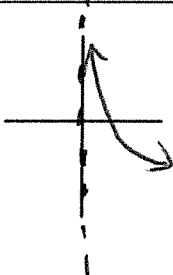
ends point move
side to side
L/R

ends point
move up + down

Family	Equation	Positive "a" Sketch	Negative "a" Sketch	Domain	Range	Description	
						a +	a -
Exponential ($b > 1$)	$y = a(b)^x$			$(-\infty, \infty)$	a + $(0, \infty)$	1 - 1 ↓ - ↑ $(-\infty, \infty)$ x-int none y-int (0, a) Asym $y = 0$ H & A As $x \rightarrow \infty, y \rightarrow \infty$	1 - 1 ↑ - ↓ $(-\infty, \infty)$ x-int none y-int (0, a) Asym $y = 0$ H & A As $x \rightarrow \infty, y \rightarrow -\infty$
					a - $(-\infty, 0)$	As $x \rightarrow -\infty, y \rightarrow 0$	As $x \rightarrow -\infty, y \rightarrow 0$
Exponential ($0 < b < 1$)	$y = a(b)^x$			$(-\infty, \infty)$	a + $(0, \infty)$	1 - 1 ↓ - ↓ $(-\infty, \infty)$ x-int none y-int (0, a) Asym $y = 0$ As $x \rightarrow \infty, y \rightarrow 0$	1 - 1 ↑ - ↑ $(-\infty, \infty)$ x-int none y-int (0, a) Asym $y = 0$ As $x \rightarrow \infty, y \rightarrow 0$
					a - $(-\infty, 0)$	As $x \rightarrow -\infty, y \rightarrow \infty$	As $x \rightarrow -\infty, y \rightarrow -\infty$

Exponential Family (G/D)
are "Neither" odd nor even

Family	Equation	Positive "a" Sketch	Negative "a" Sketch	Domain	Range	Description	
Rational (n even)	$y = \frac{a}{x^n}$			$(-\infty, 0) \cup (0, \infty)$	a + $(0, \infty)$	Many to 1, even $\uparrow (-\infty, 0)$ $\downarrow (0, \infty)$ Asym $x=0, y=0$ no x-int, y-int As $x \rightarrow \infty, y \rightarrow 0$ As $x \rightarrow -\infty, y \rightarrow 0$	Many to 1, even $\downarrow (0, \infty)$ $\uparrow (-\infty, 0)$ Asym $x=0, y=0$ no x-int, y-int As $x \rightarrow \infty, y \rightarrow 0$ As $x \rightarrow -\infty, y \rightarrow 0$
					a - $(-\infty, 0)$		
Rational (n odd)	$y = \frac{a}{x^n}$			$(-\infty, 0) \cup (0, \infty)$		1 - 1, odd $\downarrow (-\infty, 0) \cup (0, \infty)$ Asym $x=0, y=0$ no x-int, y-int As $x \rightarrow \infty, y \rightarrow 0$ As $x \rightarrow -\infty, y \rightarrow 0$	1 - 1, odd $\uparrow (-\infty, 0) \cup (0, \infty)$ Asym $x=0, y=0$ no x-int, y-int As $x \rightarrow \infty, y \rightarrow 0$ As $x \rightarrow -\infty, y \rightarrow 0$
						$\uparrow -$	$\downarrow -$

Family	Equation	Positive "a"		Domain	Range	Description	
		Sketch	Sketch			a +	a -
Logarithmic	$y = a \log x$			$(0, \infty)$	$(-\infty, \infty)$	$1 - 1 \downarrow -$ $\uparrow (-\infty, \infty)$ x-int = (1, 0) y-int none Asym $x = 0$ VA As $x \rightarrow \infty, y \rightarrow \infty$ As $x \rightarrow -\infty, y \rightarrow -\infty$	$1 - 1 \uparrow -$ $\downarrow (-\infty, \infty)$ x-int = (1, 0) y-int none Asym $x = 0$ VA As $x \rightarrow \infty, y \rightarrow -\infty$ As $x \rightarrow -\infty, y \rightarrow \infty$

Logarithm fcn's
are neither odd
nor even