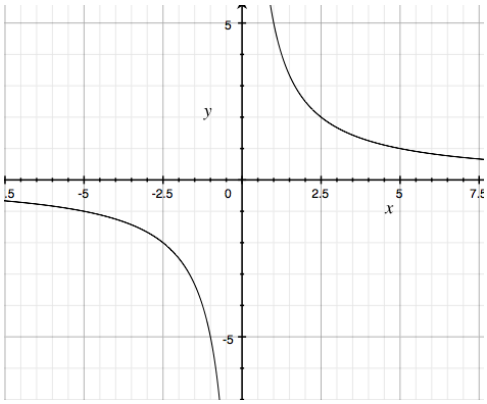
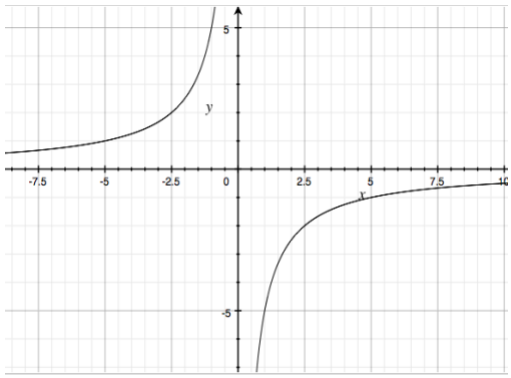
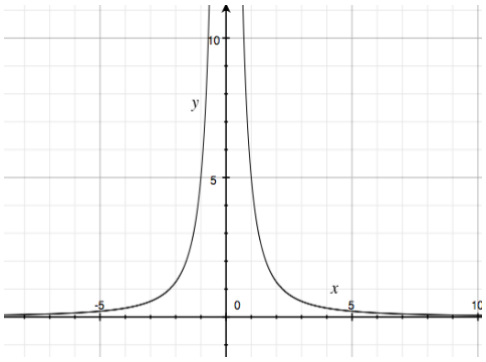
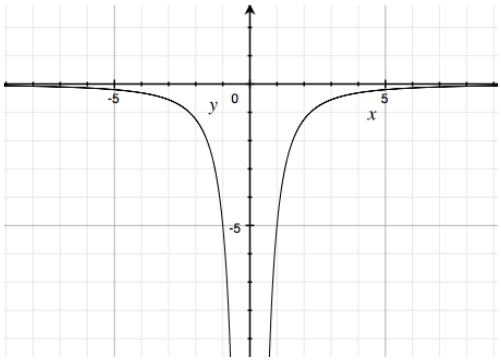
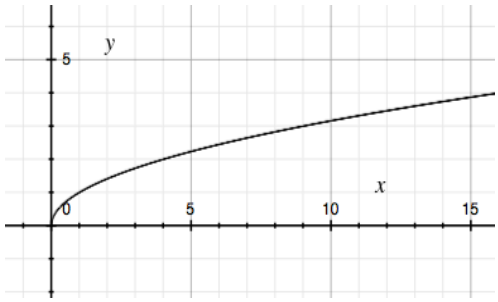
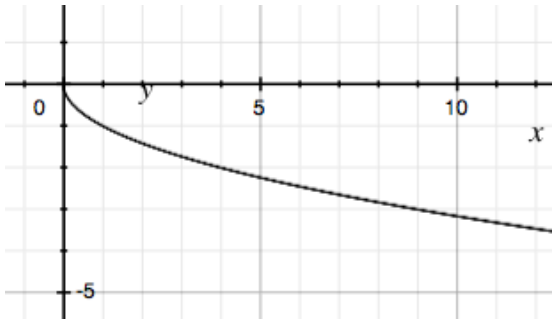
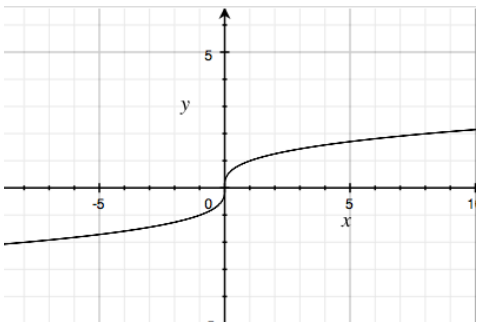
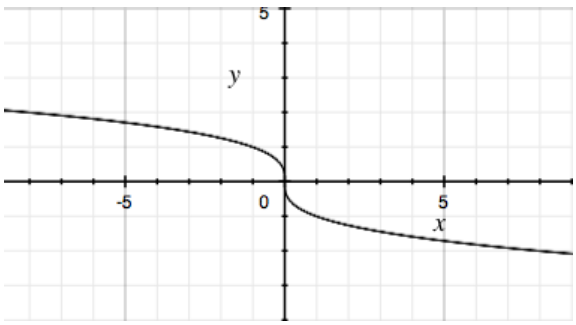
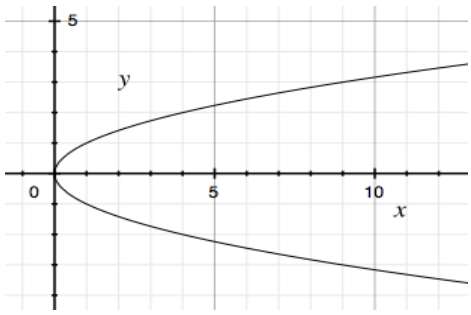
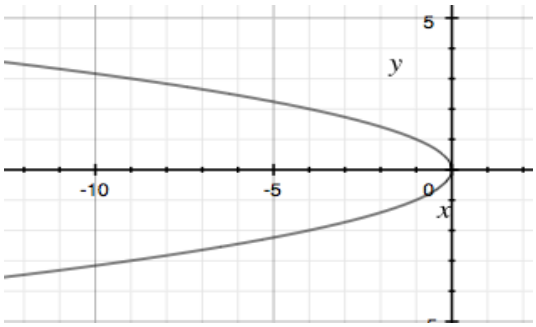
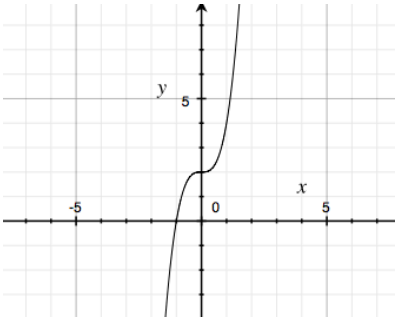
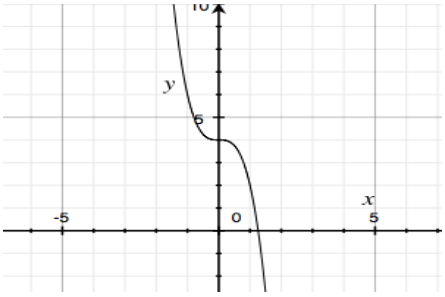
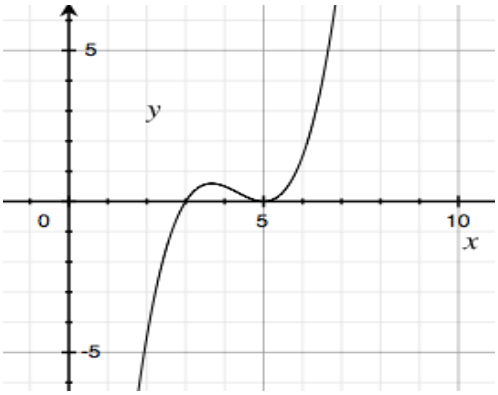
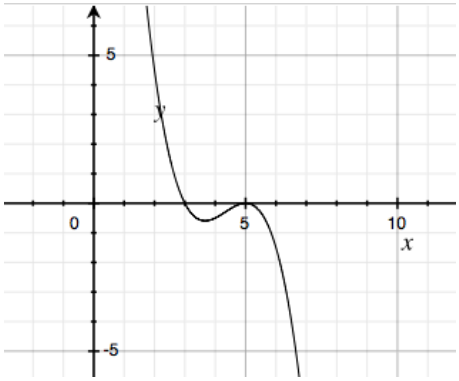
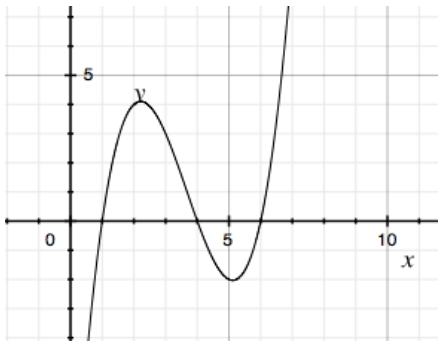
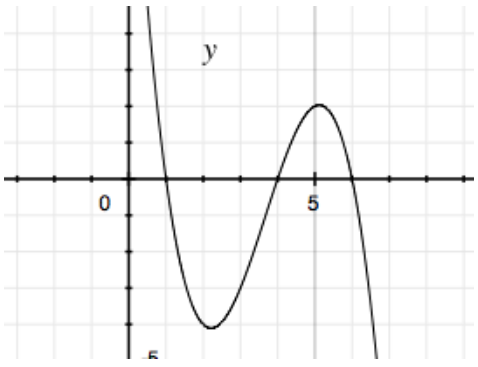
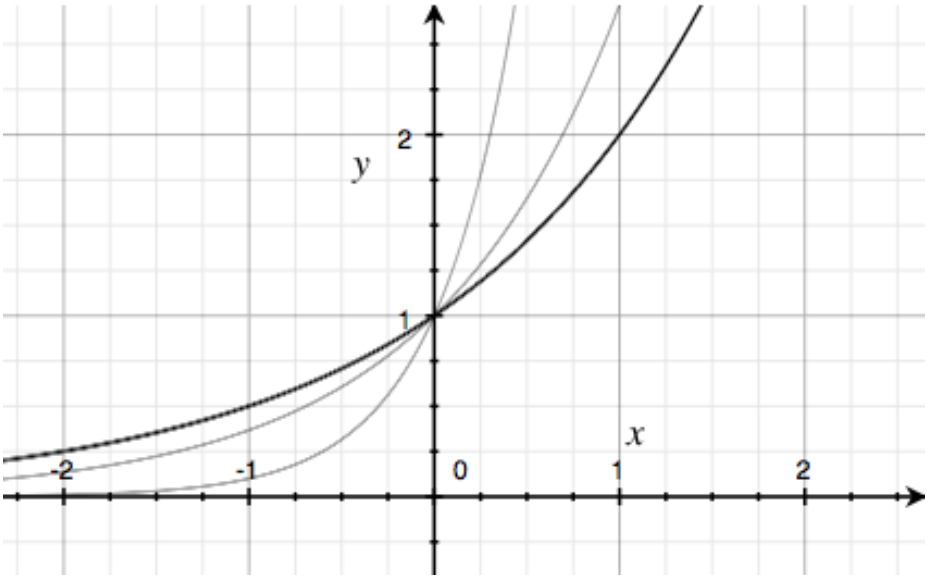
Equation	If a > 0	If a < 0
$y = \frac{a}{x}$ Asymptote: x = 0 y = 0		
$y = \frac{a}{x^2}$ Asymptote: x = 0 y = 0		
$y = ax^{\frac{1}{2}}$		
$y = ax^{\frac{1}{3}}$		

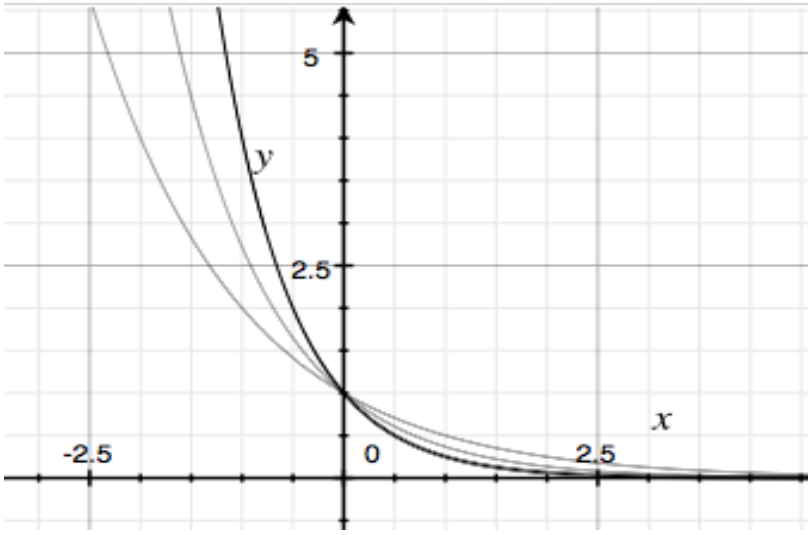
$y^2 = ax$		
$y = ax^3 + d$ y intercept = (0, d) x intercept = $(\sqrt[3]{\frac{d}{a}}, 0)$		
$y = a(x-p)(x-q)^2$	 Touches x axis at x = q Crosses x axis at x = p Roots: (p, 0) and (q, 0) where p < q (p, 0) then (q, 0)	 Touches x axis at x = q Crosses x axis at x = p Roots: (p, 0) and (q, 0) where q < p (q, 0) then (p, 0)
$y = a(x-p)(x-q)(x-r)$ 3 real and distinct roots		

Logarithm Graphs



Graph of $y = a^x$, where $a > 1$.

- Domain: $(-\infty, \infty)$
- Range: $(0, \infty)$
- As value of x increases, value of y increases.
- y intercept: NIL (Graph does not touch x axis, asymptote: y = 0)
- x intercept: (0, 1)



Graph $y = a^x$, where $a < 1$.

- Domain: $(-\infty, \infty)$
- Range: $(0, \infty)$
- As value of x increases, value of y decreases.
- y intercept: NIL
- x intercept (0,1)

Graphical Transformation

Equation	Transformation	Values
$y = f(x) + a$	Graph translates parallel to y axis by a units.	(x, y $\pm$ a) → y values change
$y = f(x + a)$	Graph translates parallel to x axis by –a units.	(x + a, y) → x values change
$y = f(ax)$	Graph is stretched parallel to the x axis by scale factor 1/a.	(x/a, ay) → x values change
$y = af(x)$	Graph is stretched parallel to the y axis by scale factor a.	(x, ay) → y values change
$y = -f(x)$	Graph is reflected in the x axis.	x, -y → y values change
$y = f(-x)$	Graph is reflected in the y axis.	-x, y → x values change

For transformations that affect y values, f(x) remains intact.
For transformations that affect x values, change is within bracket.