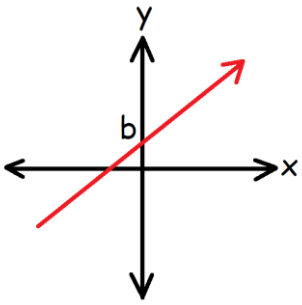
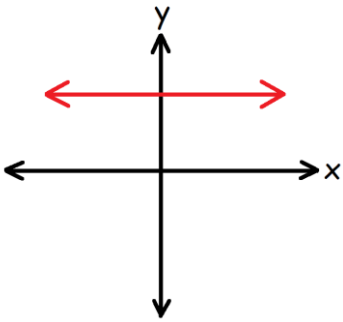
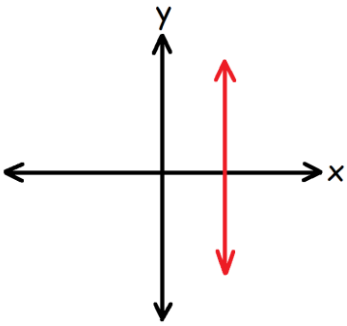
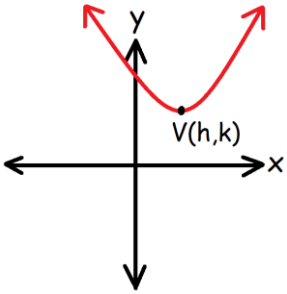
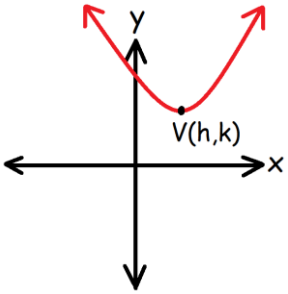
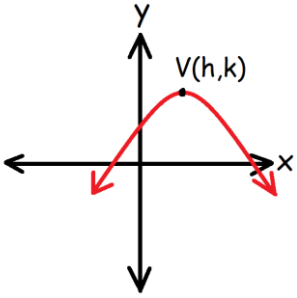
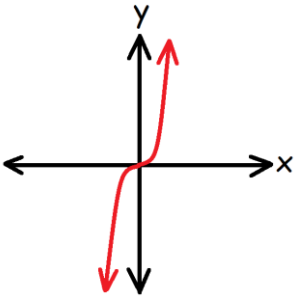
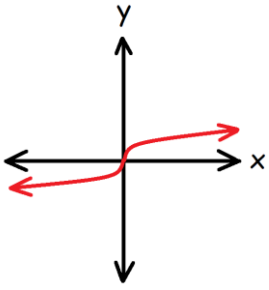
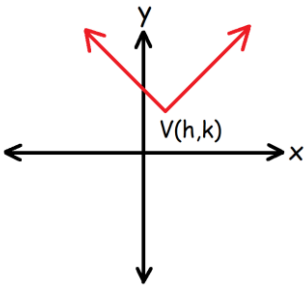
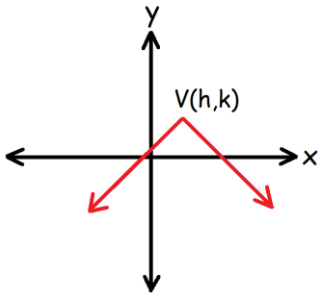
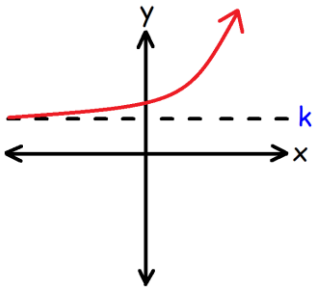
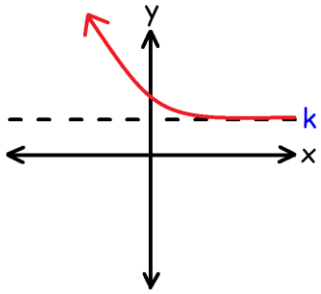
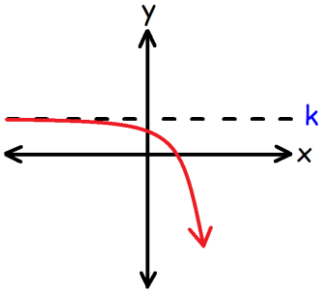
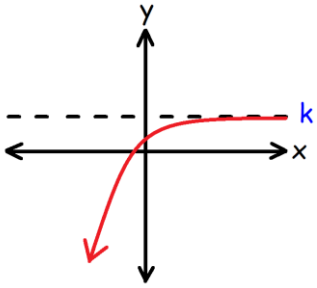
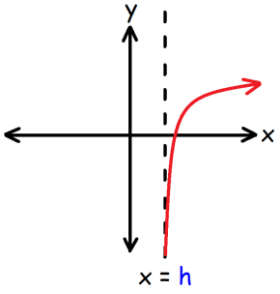
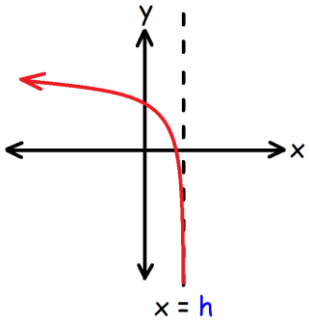
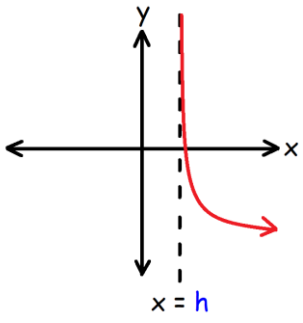
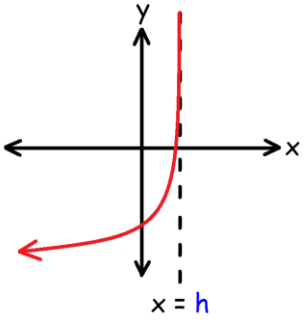
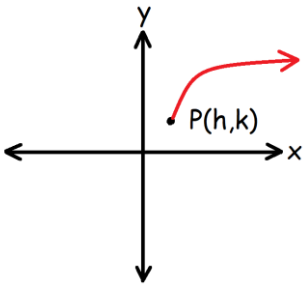
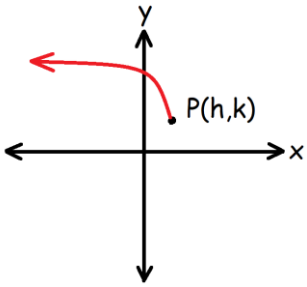
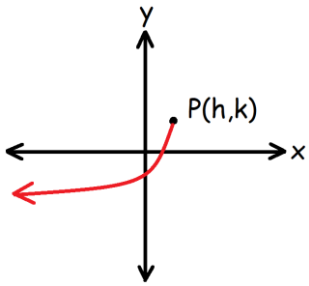
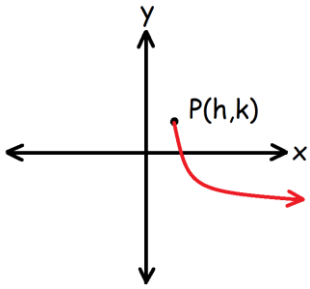
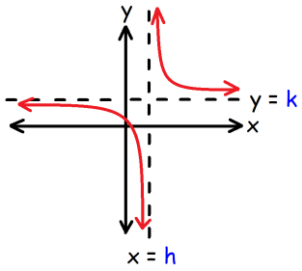
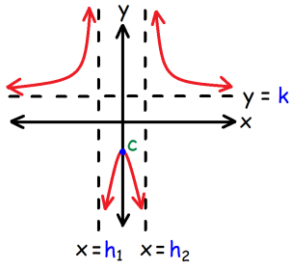
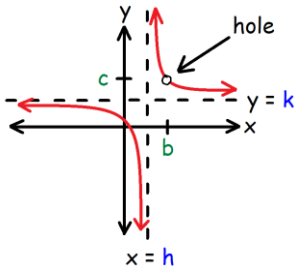
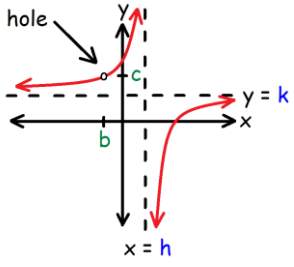
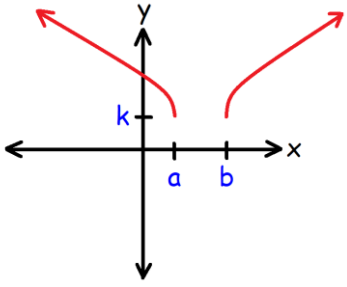
Domain and Range Formula Sheet:

Linear Functions: $y = mx + b$  $Domain: (-\infty, \infty)$ $Range: (-\infty, \infty)$	Horizontal Line: (m = 0) $y = k$  $Domain: (-\infty, \infty)$ $Range: \{k\}$	Vertical Line: (m = undefined) $x = h$  $Domain: \{h\}$ $Range: (-\infty, \infty)$
Quadratic Functions: (a = +) $y = ax^2 + bx + c$  $Domain: (-\infty, \infty)$ $Range: [k, \infty)$ $h = -b/2a \quad k = f(-b/2a)$	Quadratic Functions: (a = +) $y = a(x-h)^2 + k$  $Domain: (-\infty, \infty)$ $Range: [k, \infty)$ $Vertex\ Form$	Quadratic Functions: (a = -) $y = ax^2 + bx + c$  $Domain: (-\infty, \infty)$ $Range: (-\infty, k]$ $Standard\ Form$
Cubic Functions: $y = ax^3 + bx^2 + cx + d$  $Domain: (-\infty, \infty)$ $Range: (-\infty, \infty)$	Cube Root Function: $y = \sqrt[3]{x}$  $Domain: (-\infty, \infty)$ $Range: (-\infty, \infty)$	Absolute Value Functions: (a = +) $y = a\|x-h\| + k$  $Domain: (-\infty, \infty)$ $Range: [k, \infty)$

Absolute Value Functions: (a = -) $y = a\|x - h\| + k$  $Domain$: $(-\infty, \infty)$ $Range$: $(-\infty, k]$	Exponential Functions: $y = a^x + k$  $Domain$: $(-\infty, \infty)$ $Range$: (k, ∞)	Exponential Functions: $y = a^{-x} + k$  $Domain$: $(-\infty, \infty)$ $Range$: (k, ∞)
Exponential Functions: $y = -a^x + k$  $Domain$: $(-\infty, \infty)$ $Range$: $(-\infty, k)$	Exponential Functions: $y = -a^{-x} + k$  $Domain$: $(-\infty, \infty)$ $Range$: $(-\infty, k)$	Logarithmic Functions: $y = \log_a(x - h)$  $Domain$: (h, ∞) $Range$: $(-\infty, \infty)$
Logarithmic Functions: $y = \log_a(h - x)$  $Domain$: $(-\infty, h)$ $Range$: $(-\infty, \infty)$	Logarithmic Functions: $y = -\log_a(x - h)$  $Domain$: (h, ∞) $Range$: $(-\infty, \infty)$	Logarithmic Functions: $y = -\log_a(h - x)$  $Domain$: $(-\infty, h)$ $Range$: $(-\infty, \infty)$

Radical Functions: $y = \sqrt{x-h} + k$  $Domain$: $[h, \infty)$ $Range$: $[k, \infty)$	Radical Functions: $y = \sqrt{h-x} + k$  $Domain$: $(-\infty, h]$ $Range$: $[k, \infty)$	Radical Functions: $y = -\sqrt{h-x} + k$  $Domain$: $(-\infty, h]$ $Range$: $(-\infty, k]$
Radical Functions: $y = -\sqrt{x-h} + k$  $Domain$: $[h, \infty)$ $Range$: $(-\infty, k]$	Rational Functions: (a > 0) $y = \frac{a}{x-h} + k$  $Domain$: $(-\infty, h)\ U\ (h, \infty)$ $Range$: $(-\infty, k)\ U\ (k, \infty)$	Rational Functions: (a > 0, k > c) $y = \frac{a}{(x-h_1)(x-h_2)} + k$  D: $(-\infty, h_1)\ U\ (h_1, h_2)\ U\ (h_2, \infty)$ R: $(-\infty, c)\ U\ (k, \infty)$
Rational Functions: $y = \frac{a\cancel{(x-b)}}{(x-h)\cancel{(x-b)}} + k$  D: $(-\infty, h)\ U\ (h, b)\ U\ (b, \infty)$ R: $(-\infty, k)\ U\ (k, c)\ U\ (c, \infty)$ Note: b > h and c > k.	Rational Functions: $y = \frac{a\cancel{(x-b)}}{(x-h)\cancel{(x-b)}} + k$  D: $(-\infty, b)\ U\ (b, h)\ U\ (h, \infty)$ R: $(-\infty, k)\ U\ (k, c)\ U\ (c, \infty)$ Note: h > b and c > k.	Complex Radical Functions: $y = \sqrt{(x-a)(x-b)} + k$  $Domain$: $(-\infty, a]\ U\ [b, \infty)$ $Range$: $[k, \infty)$

Steps for Finding the Domain of Certain Functions:

1. $For\ y = \frac{1}{ax+b} \rightarrow\ \ Set\ ax + b \neq 0\ \ and\ solve\ for\ x.$

2. $For\ y = \sqrt{ax+b} \rightarrow\ \ Set\ ax + b \geq 0\ \ and\ solve\ for\ x.$

3. $For\ y = \sqrt{ax^2+bx+c} \rightarrow\ \ Set\ ax^2 + bx + c \geq 0, factor\ and\ solve\ for\ x.$

4. $For\ y = \log_a(bx+c) \rightarrow\ \ Set\ bx + c > 0\ \ and\ solve\ for\ x.$

5. $For\ y = \frac{1}{\sqrt{ax+b}} \rightarrow\ \ Set\ ax + b\ > 0\ \ and\ solve\ for\ x.$

6. $For\ y = \frac{1}{\sqrt{ax^2+bx+c}} \rightarrow\ \ Set\ ax^2 + bx + c > 0, factor\ and\ solve\ for\ x.$

Note: A number line may be helpful for #3 and #6.