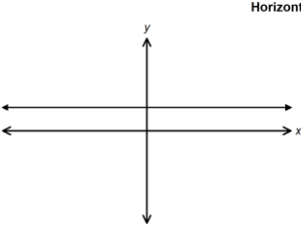
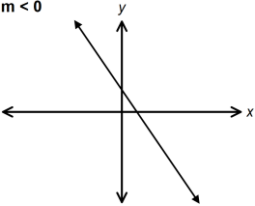
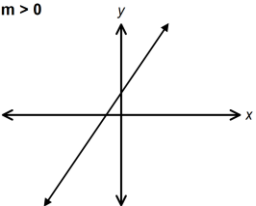
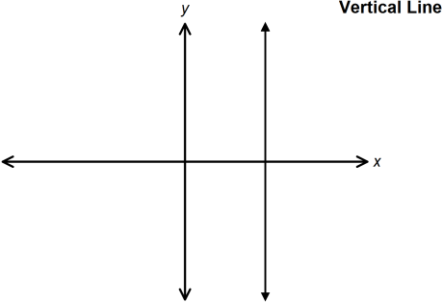
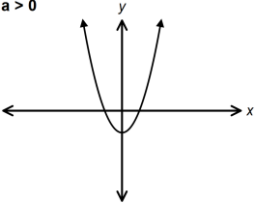
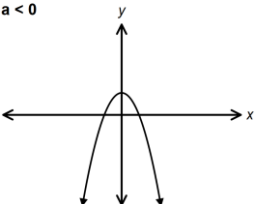
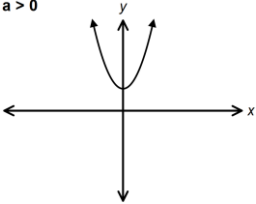
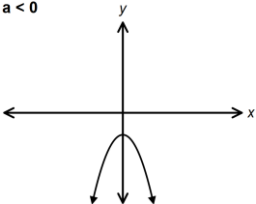
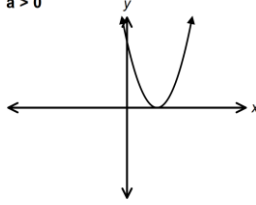
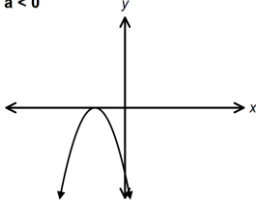
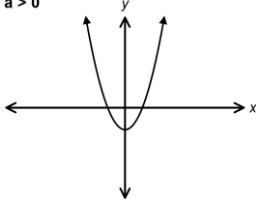
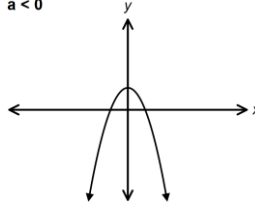


Constant Functions

a) Equation	Written in the form $y = b$ where b is a constant
b) Degree	0 (No x term)
c) Shape of graph	 <p style="text-align: center;">Horizontal Line</p>
d) Number of y-intercepts (Point where graph crosses y axis)	One with coordinates $(0, b)$
e) Number of x-intercepts (Point where graph crosses x-axis)	None except for the line $y = 0$ which is every point on the x-axis
f) Domain	$\{x / x \in R\}$
g) Range	$\{\text{value of "b"}\}$
h) Number of Turning Points	None
i) End Behavior	<ul style="list-style-type: none"> i) Extends from Quadrant II to Quadrant I ii) Extends from Quadrant III to Quadrant IV

Linear Functions	
a) Equation	Written in the form $y = mx + b$ where m is the slope and b is the y-intercept
b) Degree	1
c) Shape of graph	<div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;"> <p>$m < 0$</p>  </div> <div style="text-align: center;"> <p>$m > 0$</p>  </div> </div>
d) Number of y-intercepts	One with coordinates $(0, b)$
e) Number of x-intercepts	One
f) Domain	$\{x / x \in R\}$
g) Range	$\{y / y \in R\}$
h) Number of Turning Points	None
i) End Behavior	i) ($m > 0$) Extends from Quadrant III to Quadrant I (Up in Quadrant I and Down in Quadrant III) ii) ($m < 0$) Extends from Quadrant II to Quadrant IV (Up in Quadrant II and down in Quadrant IV)
Special Case	Equation $x = "c"$ where c is a constant <div style="text-align: center; margin: 10px 0;">  </div> One x intercept and no y intercept except for the line $x = 0$ where all points on the y axis are y intercepts

Quadratic Functions

a) Equation	Written in Standard Form $y = ax^2 + bx + c$ where “a” is the leading coefficient and “c” is the constant term or in Vertex Form $y = a(x - h)^2 + k$ Where (h, k) is the vertex of the parabola.
b) Degree	2
c) Shape of graph	<div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;"> <p>$a > 0$</p>  </div> <div style="text-align: center;"> <p>$a < 0$</p>  </div> </div>
d) Number of y-intercepts	One with coordinates (0, c)
e) Number of x-intercepts	<p><u>Zero</u> (Minimum Number)</p> <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;"> <p>$a > 0$</p>  </div> <div style="text-align: center;"> <p>$a < 0$</p>  </div> </div>
	<p><u>One</u></p> <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;"> <p>$a > 0$</p>  </div> <div style="text-align: center;"> <p>$a < 0$</p>  </div> </div>
	<p><u>Two</u> (Maximum Number)</p> <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;"> <p>$a > 0$</p>  </div> <div style="text-align: center;"> <p>$a < 0$</p>  </div> </div>

f) Domain	$\{x/x \in R\}$
g) Range	$a > 0 \Rightarrow \{y/y \geq \text{"minimum value"} , y \in R\}$ $a < 0 \Rightarrow \{y/y \leq \text{"maximum value"} , y \in R\}$
h) Number of Turning Points	One
i) End Behavior	i) ($a > 0$) Extends from Quadrant II to Quadrant I (Up in Quadrant I and up in Quadrant II) ii) ($a < 0$) Extends from Quadrant III to Quadrant IV (Down in Quadrant III and down in Quadrant IV)

Note:

1. Vertex Form $y = a(x-h)^2 + k$

Vertex (h, k) k is a maximum value if $a < 0$

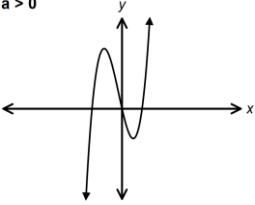
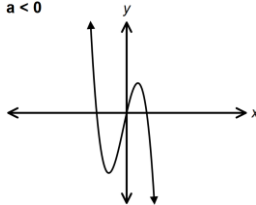
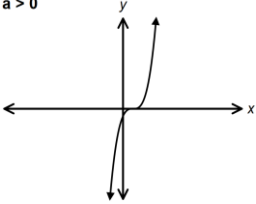
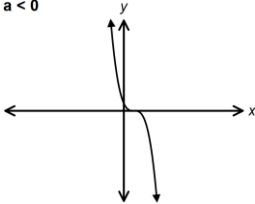
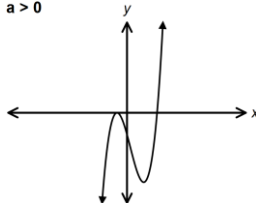
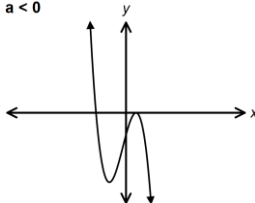
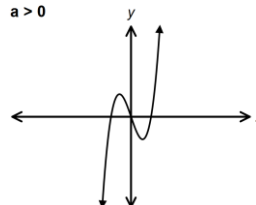
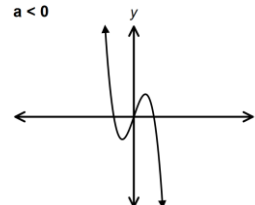
k is a minimum value if $a > 0$

2. Standard Form $y = ax^2 + bx + c$

Vertex $\left(-\frac{b}{2a}, f\left(-\frac{b}{2a}\right)\right)$ $f\left(-\frac{b}{2a}\right)$ is a maximum value if $a < 0$

$f\left(-\frac{b}{2a}\right)$ is a minimum value if $a > 0$

Cubic Functions

a) Equation	Written in the form $y = ax^3 + bx^2 + cx + d$ where “a” is the leading coefficient and “d” is the constant term
b) Degree	3
c) Shape of graph	<div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;"> <p>$a > 0$</p>  </div> <div style="text-align: center;"> <p>$a < 0$</p>  </div> </div>
d) Number of y-intercepts	One with coordinates (0, d)
e) Number of x-intercepts	<p>One (Minimum Number)</p> <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;"> <p>$a > 0$</p>  </div> <div style="text-align: center;"> <p>$a < 0$</p>  </div> </div>
	<p>Two</p> <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;"> <p>$a > 0$</p>  </div> <div style="text-align: center;"> <p>$a < 0$</p>  </div> </div>
	<p>Three (Maximum Number)</p> <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;"> <p>$a > 0$</p>  </div> <div style="text-align: center;"> <p>$a < 0$</p>  </div> </div>

f) Domain	$\{x / x \in R\}$
g) Range	$\{y / y \in R\}$
h) Number of Turning Points	<p>Zero → if there is one x intercept</p> <p>Two → if there is one or two x intercepts</p>
i) End Behavior	<p>i) ($a > 0$) Extends from Quadrant III to Quadrant I (Down in Quadrant III and up in Quadrant I)</p> <p>ii) ($a < 0$) Extends from Quadrant II to Quadrant IV (Up in Quadrant II and down in Quadrant IV)</p>