

**Linear Functions**

Slope:

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

Slope Intercept Form:

$$y = mx + b$$

Standard Form:

$$Ax + By = C$$

Point-Slope Form:

$$y - y_1 = m(x - x_1)$$

**Quadratic Functions**

General Form:

$$0 = ax^2 + bx + c$$

Axis of symmetry:  $x = \frac{-b}{2a}$ 

Vertex (Standard) Form:

$$f(x) = a(x - h)^2 + k \text{ where } (h, k) \text{ is the vertex}$$

Intercept Form:

$$f(x) = a(x - p)(x - q)$$

where  $(p, 0), (q, 0)$  are  $x$  - intercepts

Quadratic Formula:

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

**Exponential & Logarithmic Functions**Exponential Function:  $y = a(b)^x$ Logarithmic Function:  $y = \log_b x$  iff  $b^y = x$ 

Compound Interest Formulas:

$$A = P\left(1 + \frac{r}{n}\right)^{nt}$$

$$A = Pe^{rt}$$

Properties of Logarithms:

$$\log_b b = 1$$

$$\log_b 1 = 0$$

$$\log_b b^x = x$$

$$b^{\log_b x} = x$$

$$\log_a x = \frac{\log_b x}{\log_b a}$$

$$\log_b mn = \log_b m + \log_b n$$

$$\log_b \frac{m}{n} = \log_b m - \log_b n$$

$$\log_b m^n = n \log_b m$$

**Asymptotes of a Rational Function**

$$f(x) = \frac{N(x)}{D(x)}$$

$n$  is the degree of  $N(x)$  and  $m$  is the degree of  $D(x)$

$a$  is the lead coefficient of  $N(x)$  and  $b$  is the lead coefficient of  $D(x)$

**VA's:** there are vertical asymptotes where the denominator equals zero (set  $D(x) = 0$ )

**HA's:**

1.  $n < m$  then  $y = 0$
2.  $n = m$  then  $y = \frac{a}{b}$
3.  $n > m$  then No HA