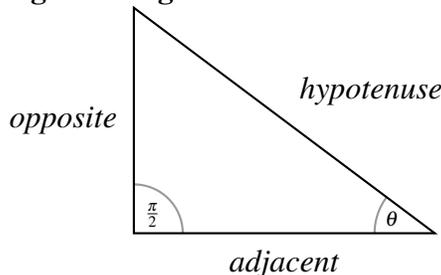


Right Triangle:

Pythagorean Identity: $(opp)^2 + (adj)^2 = (hyp)^2$

$$\sin(\theta) = \frac{opp}{hyp}$$

$$\cos(\theta) = \frac{adj}{hyp}$$

$$\tan(\theta) = \frac{opp}{adj}$$

Fundamental Trig Identities:

$$\bullet \sin^2(\theta) + \cos^2(\theta) = 1$$

$$\bullet \tan(\theta) = \frac{\sin(\theta)}{\cos(\theta)}$$

$$\bullet \sec(\theta) = \frac{1}{\cos(\theta)}$$

$$\bullet \csc(\theta) = \frac{1}{\sin(\theta)}$$

$$\bullet \cot(\theta) = \frac{1}{\tan(\theta)}$$

Rules of logarithms:

$$\bullet \log_b(x) + \log_b(y) = \log_b(xy)$$

$$\bullet * \ln(x) + \ln(y) = \ln(xy)$$

$$\bullet \log_b(x) - \log_b(y) = \log_b\left(\frac{x}{y}\right)$$

$$\bullet * \ln(x) - \ln(y) = \ln\left(\frac{x}{y}\right)$$

$$\bullet n \log_b(x) = \log_b(x^n)$$

$$\bullet * n \ln(x) = \ln(x^n)$$

$$\bullet \log_b(b) = 1$$

$$\bullet * \ln(e) = 1$$

$$\bullet \log_b(1) = 0$$

$$\bullet * \ln(1) = 0$$

$$\bullet \log_b(x) = \frac{\ln(x)}{\ln(b)}$$

Rules of exponents:

$$\bullet b^x b^y = b^{x+y}$$

$$\bullet (b^x)^y = b^{xy}$$

$$\bullet \frac{b^x}{b^y} = b^{x-y}$$

$$\bullet b^0 = 1$$

$$\bullet * e^0 = 1$$

Straight line:

$$\bullet \text{Slope of a line passing through points } (x_1, y_1) \text{ and } (x_2, y_2) \text{ is given by } m = \frac{y_2 - y_1}{x_2 - x_1}.$$

$$\bullet \text{Equation of a line with slope } m \text{ and y-intercept } b \text{ is } y = mx + b.$$

$$\bullet \text{Equation of a line through point } (x_1, y_1) \text{ and having slope } m \text{ is } y - y_1 = m(x - x_1).$$

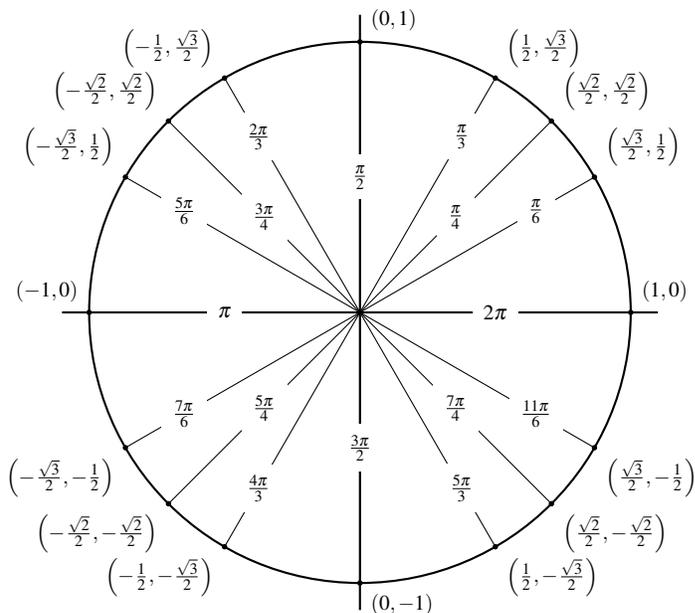
Quadratic formula:

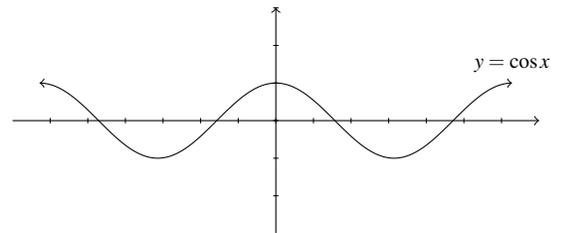
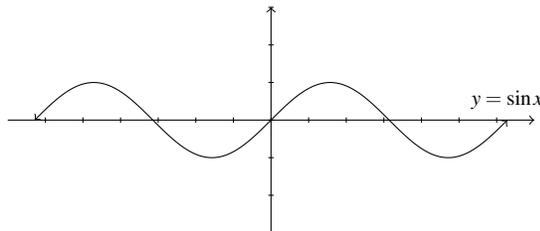
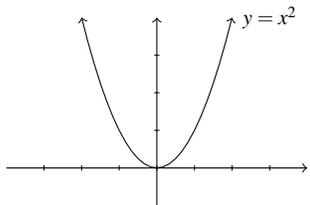
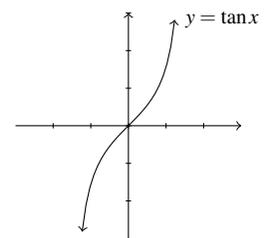
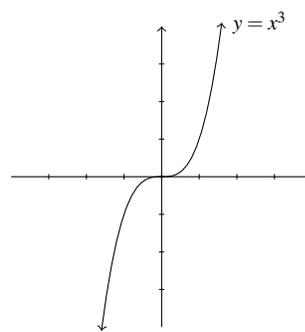
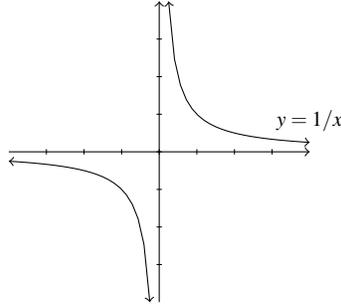
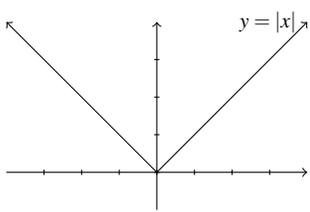
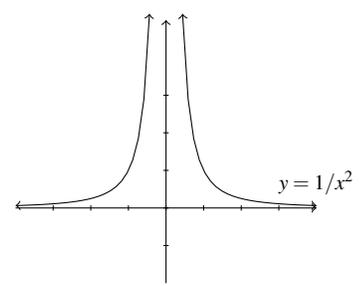
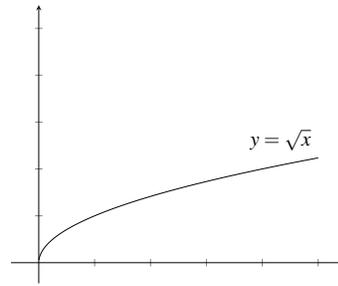
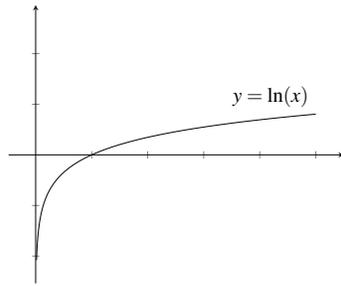
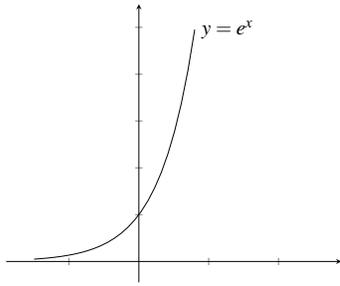
If $ax^2 + bx + c = 0$ is an equation with $a \neq 0$, then

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

Unit Circle:

Output of cosine corresponds to the x -values on the unit circle while output of sine corresponds to y -values. For example: $\cos\left(\frac{\pi}{6}\right) = \frac{\sqrt{3}}{2}$ while $\sin\left(\frac{\pi}{6}\right) = \frac{1}{2}$.



Graph of functions:**Transformation of graphs****Shifts:** Suppose $c > 0$ $y = f(x) + c$, shift the graph of $y = f(x)$ a distance c units upward $y = f(x) - c$, shift the graph of $y = f(x)$ a distance c units downward $y = f(x + c)$, shift the graph of $y = f(x)$ a distance c units to the left $y = f(x - c)$, shift the graph of $y = f(x)$ a distance c units to the right**Scaling:** Suppose $c > 1$ $y = cf(x)$, stretch the graph of $y = f(x)$ vertically by a factor of c $y = (1/c)f(x)$, compress the graph of $y = f(x)$ vertically by a factor of c $y = f(cx)$, compress the graph of $y = f(x)$ horizontally by a factor of c $y = f(x/c)$, stretch the graph of $y = f(x)$ horizontally by a factor of c **Reflection:** $y = -f(x)$, reflect the graph of $y = f(x)$ about the x -axis $y = f(-x)$, reflect the graph of $y = f(x)$ about the y -axis

Area and Volume:

- Area of a triangle with base b and height h is $A = \frac{1}{2}bh$.
- Area of a rectangle with base b and height h is $A = bh$.
- Area of a circle with radius r is $A = \pi r^2$.
- Volume of a rectangular box with sides l, b and h is $V = lbh$.
- Volume of a cylinder with base radius r and height h is $V = \pi r^2 h$.