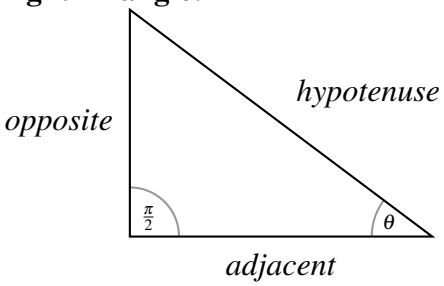
Right Triangle:



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

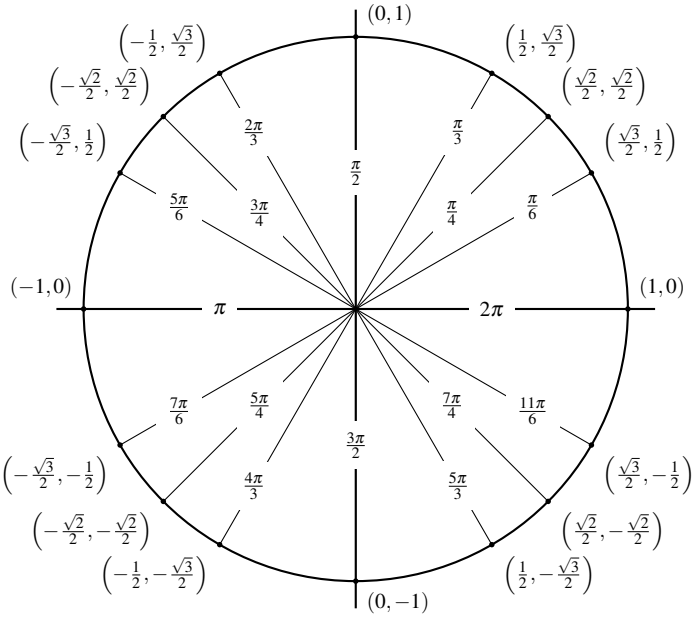
$\sin(\theta) = \dfrac{opp}{hyp}$

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

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

Unit Circle:

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



Fundamental Trig Identities:

- $\sin^2(\theta) + \cos^2(\theta) = 1$
- $\cos(\theta) = \dfrac{1}{\sec(\theta)}$
- $\tan(\theta) = \dfrac{\sin(\theta)}{\cos(\theta)}$
- $\sin(\theta) = \dfrac{1}{\csc(\theta)}$
- $\tan(\theta) = \dfrac{1}{\cot(\theta)}$

Rules of logarithms:

- $\log_b(x) + \log_b(y) = \log_b(xy)$
  - $\ln(x) + \ln(y) = \ln(xy)$
- $\log_b(x) - \log_b(y) = \log_b(\frac{x}{y})$
  - $\ln(x) - \ln(y) = \ln(\frac{x}{y})$
- $n\log_b(x) = \log_b(x^n)$
  - $n\ln(x) = \ln(x^n)$
- $\log_b(b) = 1$
  - $\ln(e) = 1$
- $\log_b(1) = 0$
  - $\ln(1) = 0$
- $\log_b(x) = \dfrac{\ln(x)}{\ln(b)}$

Rules of exponents:

- $b^x b^y = b^{x+y}$
- $(b^x)^y = b^{xy}$
- $\frac{b^x}{b^y} = b^{x-y}$
- $b^0 = 1$
  - $e^0 = 1$

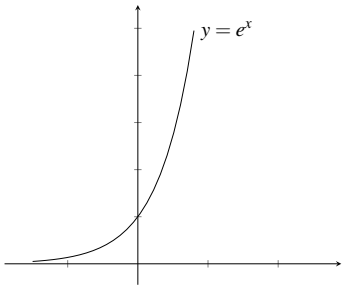
Straight line:

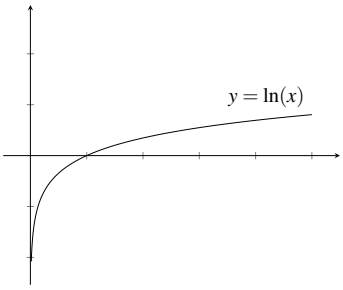
- Slope of a line passing through points (x_1, y_1) and (x_2, y_2) is given by $m = \frac{y_2 - y_1}{x_2 - x_1}$.
- Equation of a line with slope m and y-intercept b is $y = mx + b$.
- Equation of a line through point (x_1, y_1) and having slope m is $y - y_1 = m(x - x_1)$.

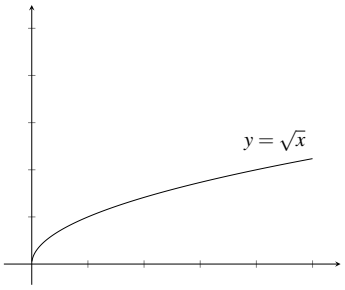
Quadratic formula:
If $ax^2+bx+c=0$ is an equation with $a \neq 0$, then

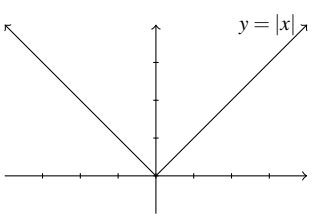
$$x = \frac{-b \pm \sqrt{b^2-4ac}}{2a}.$$

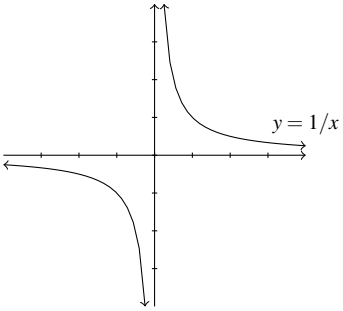
Graph of functions:

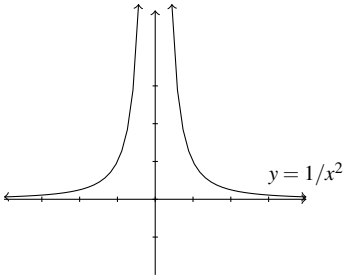


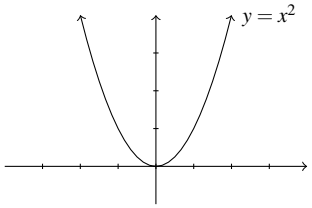


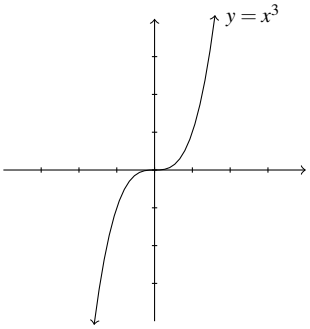


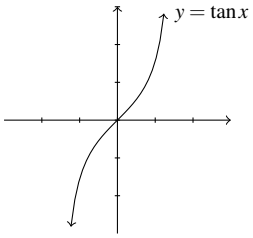


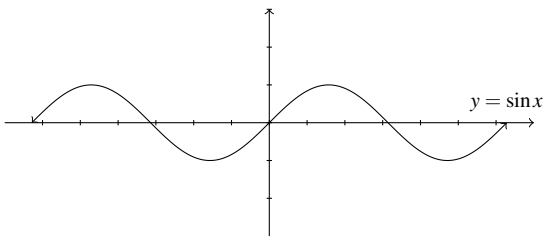


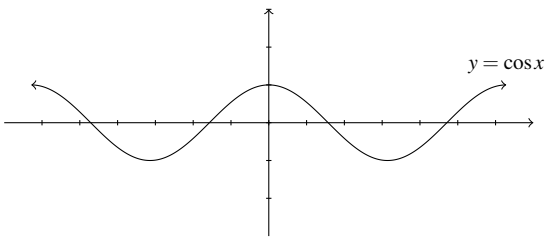












Transformation of graphs
Shifts: Suppose $c > 0$
$y = f(x)+c$, shift the graph of $y = f(x)$ a distance c units upward
$y = f(x)-c$, shift the graph of $y = f(x)$ a distance c units downward
$y = f(x+c)$, shift the graph of $y = f(x)$ a distance c units to the left

$y = f(x-c)$, 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
$y = f(cx)$, stretch the graph of $y = f(x)$ horizontally by a factor of c
$y = f(x/c)$, compress 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 $V = \pi r^2 h$.