Formula Sheet

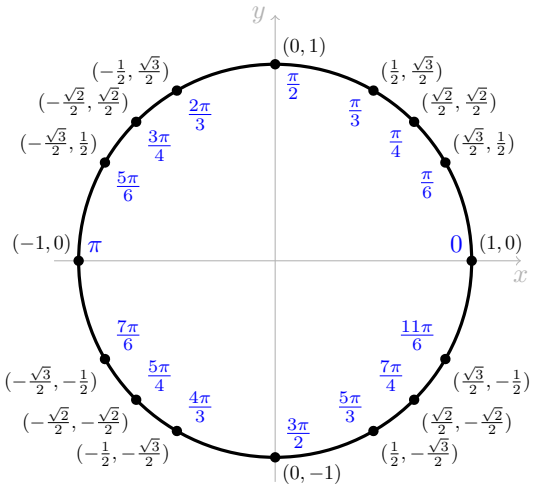
Quadratic Formula

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

Point-Slope Form

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

Common Angles



Trigonometry Ratios

- $\tan x = \dfrac{\sin x}{\cos x} \qquad \cot x = \dfrac{\cos x}{\sin x}$
- $\sec x = \dfrac{1}{\cos x} \qquad \csc x = \dfrac{1}{\sin x}$

Angle Addition Identities

- $\cos(a + b) = \cos a \cos b - \sin a \sin b$
- $\sin(a + b) = \sin a \cos b + \sin b \cos a$

Trigonometry Limits

- $\lim\limits_{x \to 0} \dfrac{\sin x}{x} = 1$
- $\lim\limits_{x \to 0} \dfrac{1 - \cos x}{x} = 0$

Definition of Derivative

- $f'(x) = \lim\limits_{h \to 0} \dfrac{f(x + h) - f(x)}{h}$, or
- $f'(a) = \lim\limits_{x \to a} \dfrac{f(x) - f(a)}{x - a}$

Selected Derivatives

- $\dfrac{d}{dx} \tan x = \sec^2 x$
- $\dfrac{d}{dx} \sec x = \sec x \tan x$
- $\dfrac{d}{dx} \cot x = -\csc^2 x$
- $\dfrac{d}{dx} \csc x = -\csc x \cot x$

Linear Approximation

- $f(x) \approx f(a) + f'(a)(x - a)$

Error and Relative Error

- $dy \approx$ the error in y
- $\dfrac{dy}{y} \approx$ the relative (percent) error in y

Newton's Method

- $x_{n+1} = x_n - \dfrac{f(x_n)}{f'(x_n)}$

Summation Formulas

- $\sum\limits_{i=1}^{n} i = \dfrac{n(n+1)}{2}$
- $\sum\limits_{i=1}^{n} i^2 = \dfrac{n(n+1)(2n+1)}{6}$

Riemann Sum

- $A \approx \sum\limits_{i=1}^{n} f(x_i)\Delta x$ where
- $\Delta x = \dfrac{b - a}{n}$ and
- $x_i = a + i\Delta x$

Average Value of a Function

- $\dfrac{1}{b - a} \displaystyle\int_a^b f(x)\,dx$