Unit 6: Calculus of Trigonometry

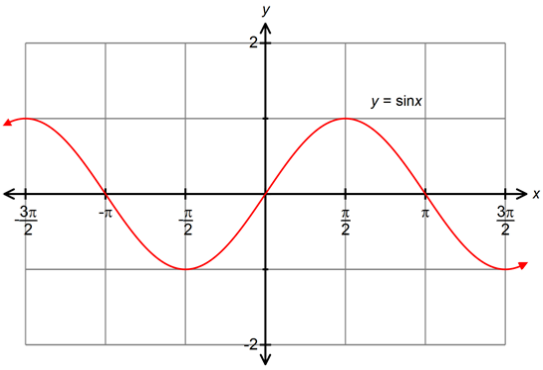
(i) Limits of Trigonometric Functions

(ii) Derivatives of Trigonometric Functions

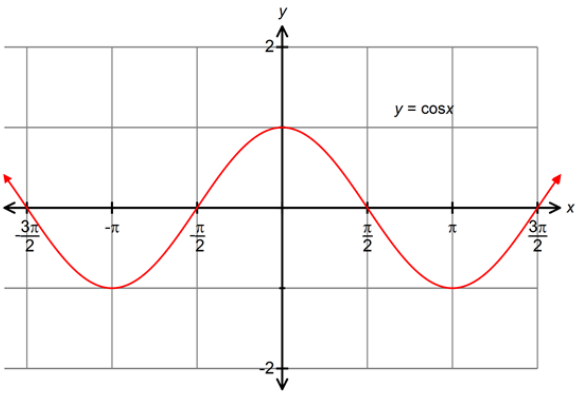
(iii) Inverse Trigonometric Functions

Section 6.1 Limits of Trigonometric Functions

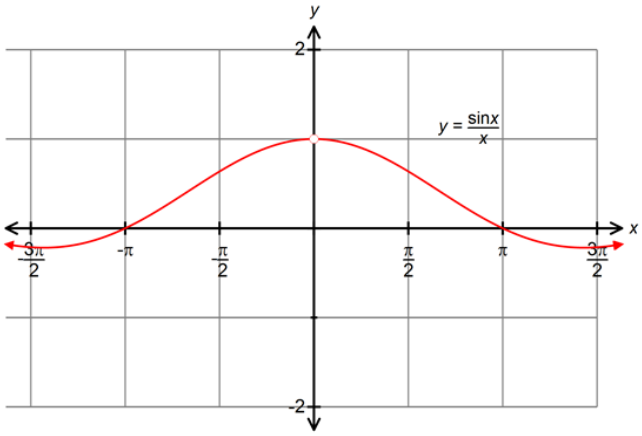
(i) $\lim_{x \to 0} \sin x$



(ii) $\lim_{x \to 0} \cos x$



(iii) $\lim_{x\to 0}\dfrac{\sin x}{x}$



(iv) $\lim_{x\to 0}\dfrac{1-\cos x}{x}$

The Trig Limit Toolbox

$\lim_{x\to 0}\sin x = 0$

$\lim_{x\to 0}\cos x = 1$

$\lim_{x\to 0}\dfrac{\sin x}{x} = 1$

$\lim_{x\to 0}\dfrac{\cos x - 1}{x} = \lim_{x\to 0}\dfrac{1-\cos x}{x} = 0$

Example 1: Evaluate the following:

(a) $\lim_{x\to 0}(x+\sin x)$

(b) $\lim_{x\to 0}\dfrac{\csc x}{\cot x}$

(c) $\lim_{x\to 0}\dfrac{\sin^2 x\cos x}{1-\cos x}$

Remember: $\lim_{x\to 0}\frac{\sin x}{x}$

(d) $\lim_{x\to 0}\frac{\sin 5x}{x}$

(e) $\lim_{x\to 0}\frac{\sin 5x}{3x}$

(f) $\lim_{x\to 0}\frac{\sin 3x}{\sin 7x}$

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(g) $\lim_{x\to 0}\dfrac{\sin 2x}{2x^2+x}$

(h) $\lim_{x\to 0}\dfrac{\sin x}{x+\tan x}$

(i) $\lim_{x\to 0}\dfrac{\sin^2 x}{x^2}$

(j) $\lim_{x \to 0} \frac{\tan x}{x}$