C12 - 1.5 - Trig Limits Notes

$\lim_{x\to \frac{\pi}{2}} \sin x = \sin\left(\frac{\pi}{2}\right) = 1$

$\lim_{x\to \infty} \sin\left(\frac{1}{x}\right) = \sin 0 = 0$

$\boxed{\begin{matrix} x \to \infty \\ \frac{1}{x} \to 0 \end{matrix}}$

$\lim_{x\to \infty} \cos\left(\frac{1}{x}\right) = \cos 0 = 1$

$\lim_{x\to 0} \sin\left(\frac{1}{x}\right) =$ und

Identities

$\lim_{x\to 0} \frac{tanx}{x} =$

$\lim_{x\to 0} \frac{sinx}{x} \times \frac{1}{cosx} = 1 \times 1 = 1$

L'hopital's Rule

$\lim_{x\to 0} \frac{tanx}{x} =$

$\lim_{x\to 0} \frac{\sec^2 x}{1} = 1$

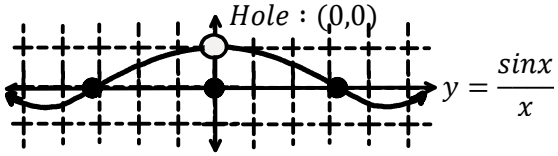
$\lim_{x\to 0} \frac{1-cosx}{x} =$

$\lim_{x\to 0} \frac{0+sinx}{1} = 0$

$\lim_{x\to 0} \frac{cosx-1}{x} =$

$\lim_{x\to 0} \frac{-sinx-0}{1} = 0$

$\boxed{\lim_{x\to 0} \frac{sinx}{x} = 1}$



$\lim_{x\to \infty} \frac{sinx}{x} = \frac{\#}{\infty} = 0$

$\lim_{x\to 0} \frac{sin2x}{2x} = 1$

$\boxed{\lim_{x\to 0} \frac{sinx}{x} = 1}$

$\lim_{x\to 0} \frac{sin2x}{x}$

$\lim_{x\to 0} \frac{sin2x}{x} \times \frac{2}{2}$

$\lim_{x\to 0} \frac{sin2x}{2x} \times 2$

$1 \times 2 = 2$

$\lim_{x\to 0} \frac{sin2x}{4x}$

$\lim_{x\to 0} \frac{sin2x}{2x} \times \frac{1}{2}$

$1 \times \frac{1}{2} = \frac{1}{2}$

$\lim_{x\to 0} \frac{sin2x}{sin3x}$

$\lim_{x\to 0} \frac{\frac{sin2x}{1}}{\frac{sin3x}{1}} \times \frac{\frac{2x}{2x}}{\frac{3x}{3x}}$

$\lim_{x\to 0} \frac{\frac{sin2x}{2x}}{\frac{sin3x}{3x}} \times \frac{\frac{2x}{1}}{\frac{3x}{1}}$

$\frac{1}{1} \times \frac{2x}{3x} = \frac{2}{3}$

$\lim_{x\to 0} \frac{tan4x}{tan3x}$

$\lim_{x\to 0} \frac{\frac{tan4x}{1} \times \frac{4x}{4x}}{\frac{tan3x}{1} \times \frac{3x}{3x}}$

$\lim_{x\to 0} \frac{\frac{tan4x}{4x} \times 4x}{\frac{tan3x}{3x} \times 3x}$

$\frac{1 \times 4x}{1 \times 3x}$

$\frac{4}{3}$