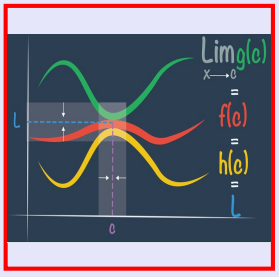
Calculus I

Lecture 6



Feb 19-8:47 AM

More on limits

Evaluate $\lim_{x \to \pi/2} (2\sin x - 1)$

$= 2\left(\sin\frac{\pi}{2}\right) - 1 = 2 \cdot 1 - 1 = \boxed{1}$ (the $\sin\frac{\pi}{2}$ term is labeled 1)

Evaluate $\lim_{x \to \pi/2} \left(\sin 2x - \frac{1}{2}\cos x\right)$

$= \sin 2\left(\frac{\pi}{2}\right) - \frac{1}{2}\cos\frac{\pi}{2}$

$= \sin\pi - \frac{1}{2}\cos\frac{\pi}{2}$

$= 0 - \frac{1}{2} \cdot 0 = \boxed{0}$

Sep 4-7:29 AM

Evaluate $\lim_{x \to -1} \frac{2x^2 - 5x - 7}{x^2 - 5x - 6} = \frac{2(-1)^2 - 5(-1) - 7}{(-1)^2 - 5(-1) - 6}$

$= \frac{0}{0}$ I.F.

$x-(-1)$

$= \lim_{x \to -1} \frac{(x+1)(2x-7)}{(x+1)(x-6)} = \lim_{x \to -1} \frac{2x-7}{x-6}$

$x-(-1)$

$= \frac{2(-1)-7}{-1-6} = \frac{-9}{-7} = \boxed{\frac{9}{7}}$

Sep 4-7:35 AM

Evaluate $\lim_{x \to 0} \frac{\frac{1}{x+4} - \frac{1}{4}}{x} = \frac{\frac{1}{0+4} - \frac{1}{4}}{0}$

$= \frac{\frac{1}{4} - \frac{1}{4}}{0} = \frac{0}{0}$ I.F.

LCD $= (x+4) \cdot 4$

$= \lim_{x \to 0} \frac{(x+4) \cdot 4 \cdot \frac{1}{x+4} - (x+4) \cdot 4 \cdot \frac{1}{4}}{(x+4) \cdot 4 \cdot x}$

$= \lim_{x \to 0} \frac{4 - (x+4)}{(x+4) \cdot 4 \cdot x} = \lim_{x \to 0} \frac{-x}{4x(x+4)} = \lim_{x \to 0} \frac{-1}{4(x+4)}$

$= \frac{-1}{4(0+4)} = \boxed{\frac{-1}{16}}$

Sep 4-7:42 AM

Evaluate $\lim_{x \to 5} \frac{\sqrt{x+4} - 3}{x-5}$

$= \frac{\sqrt{5+4} - 3}{5-5}$

$A^2 - B^2$

$= \frac{\sqrt{9} - 3}{5-5} = \frac{0}{0}$ I.F.

$(A - B)(A + B)$

$\lim_{x \to 5} \frac{(\sqrt{x+4} - 3)(\sqrt{x+4} + 3)}{(x-5)(\sqrt{x+4} + 3)}$

$= \lim_{x \to 5} \frac{(\sqrt{x+4})^2 - (3)^2}{(x-5)(\sqrt{x+4} + 3)} = \lim_{x \to 5} \frac{x+4-9}{(x-5)(\sqrt{x+4} + 3)}$

$= \lim_{x \to 5} \frac{x-5}{(x-5)(\sqrt{x+4} + 3)} = \lim_{x \to 5} \frac{1}{\sqrt{x+4} + 3}$

$= \frac{1}{\sqrt{5+4} + 3} = \frac{1}{\sqrt{9} + 3}$

$= \frac{1}{3+3} = \boxed{\frac{1}{6}}$

Sep 4-7:48 AM