11.3 Day 2

Tuesday, May 21, 2019 8:27 PM

- substitute
- Alg. work

Examples:

a. $\lim_{x\to -3} \dfrac{x^2+7x+12}{x^2-9}$

$\lim_{x\to -3} \dfrac{(x+4)(x+3)}{(x-3)(x+3)}$

$\dfrac{-3+4}{-3-3} = \dfrac{1}{-6}$

b. $\lim_{x\to 0} \dfrac{1-\cos^2 x}{x^2}$

$= \lim_{x\to 0} \dfrac{\sin^2 x}{x^2} = \lim_{x\to 0} \left(\dfrac{\sin x}{x}\right)^2$

$= \left(\lim_{x\to 0} \dfrac{\sin x}{x}\right)^2 = 1^2 = 1$

c. $\lim_{x\to 0} \dfrac{4x-1}{\cos^2 x} = \dfrac{4(0)-1}{\cos^2 0} = \dfrac{-1}{1} = -1$

d. $\lim_{x\to 3} \dfrac{x^3-3x^2-x+3}{x-3}$

$\lim_{x\to 3} \dfrac{(x-3)(x^2-1)}{(x-3)} = 3^2-1 = 8$

e. $\lim_{h\to 0} \dfrac{(6+h)^2-36}{h}$

$\lim_{h\to 0} \dfrac{36+12h+h^2-36}{h}$

$\lim_{h\to 0} \dfrac{h(12+h)}{h} = 12$

f. $\lim_{a\to -5} \dfrac{\left(\dfrac{25}{a}-a\right)}{(5+a)} \dfrac{a}{a}$

$\lim_{a\to -5} \dfrac{25-a^2}{a(5+a)}$

$\lim_{a\to -5} \dfrac{(5-a)(5+a)}{a(5+a)} = \dfrac{10}{-5} = -2$

g. $\lim_{x\to 0} \dfrac{\left(\sqrt{16+x}-4\right)}{(x)} \cdot \dfrac{\sqrt{16+x}+4}{\left(\sqrt{16+x}+4\right)}$

$\lim_{x\to 0} \dfrac{(16+x)+4\sqrt{16+x}-4\sqrt{16+x}-16}{x\left(\sqrt{16+x}+4\right)}$

$= \lim_{x\to 0} \dfrac{x}{x\left(\sqrt{16+x}+4\right)} = \lim_{x\to 0} \dfrac{1}{\sqrt{16+x}+4} = \dfrac{1}{8}$

h. $\lim_{x\to -1^-} \dfrac{|x+1|}{x+1} = -1$

you try

$\lim_{x\to \frac{1}{2}} \dfrac{\left(\dfrac{3}{1-2x}+4\right)}{\left(5-\dfrac{2}{1-2x}\right)} \dfrac{1-2x}{1-2x}$

$\lim_{x\to 1/2} \dfrac{3+4(1-2x)}{5(1-2x)-2}$

$\lim_{x\to 1/2} \dfrac{3+4-8x}{5-10x-2}$

$\lim_{x\to 1/2} \dfrac{7-8x}{3-10x}$

$\dfrac{7-4}{3-5} = \dfrac{3}{-2}$