Name: Richard

Quiz 2

MATH 200

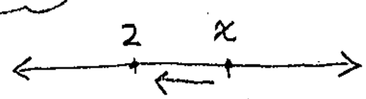
August 27, 2024

1. $\lim_{x\to 3} \frac{x^2+x-12}{x^2-9} = \lim_{x\to 3} \frac{\cancel{(x-3)}(x+4)}{\cancel{(x-3)}(x+3)} = \lim_{x\to 3} \frac{x+4}{x+3} = \frac{3+4}{3+3} = \boxed{\frac{7}{6}}$

getting $\frac{0}{0}$

2. $\lim_{x\to 2^+} \frac{4x-8}{|x-2|} = \lim_{x\to 2^+} \frac{4x-8}{x-2} = \lim_{x\to 2^+} \frac{4\cancel{(x-2)}}{\cancel{x-2}} = \lim_{x\to 2^+} 4 = \boxed{4}$

getting $\frac{0}{0}$



Note: $x-2>0$, so $|x-2| = x-2$

3. $\lim_{x\to 1} \frac{1-\frac{1}{\sqrt{x}}}{x-1} = \lim_{x\to 1} \frac{1-\frac{1}{\sqrt{x}}}{x-1}\cdot\frac{\sqrt{x}}{\sqrt{x}} = \lim_{x\to 1} \frac{\sqrt{x}-1}{(x-1)\sqrt{x}}$

getting $\frac{0}{0}$

$= \lim_{x\to 1} \frac{\cancel{\sqrt{x}-1}}{(\sqrt{x}+1)\cancel{(\sqrt{x}-1)}\sqrt{x}} = \lim_{x\to 1} \frac{1}{(\sqrt{x}+1)\sqrt{x}}$

$= \frac{1}{(\sqrt{1}+1)\sqrt{1}} = \frac{1}{2\cdot 1} = \boxed{\frac{1}{2}}$

4. $\lim_{x\to 1} \frac{x}{\cos(\pi x)-2} = \frac{1}{\cos(\pi\cdot 1)-2} = \frac{1}{-1-2} = \boxed{-\frac{1}{3}}$

Not $\frac{0}{0}$!

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1. $\lim\limits_{x\to 0} \dfrac{\frac{1}{2+x} - \frac{1}{2}}{x} = \lim\limits_{x\to 0} \dfrac{\frac{1}{2+x} - \frac{1}{2}}{x} \cdot \dfrac{2(2+x)}{2(2+x)}$

getting $\frac{0}{0}$

$$= \lim_{x\to 0} \frac{2-(2+x)}{x\,2(2+x)} = \lim_{x\to 0} \frac{-\cancel{x}}{\cancel{x}\,2(2+x)}$$

$$= \lim_{x\to 0} \frac{-1}{2(2+x)} = \frac{-1}{2(2+0)} = \boxed{-\frac{1}{4}}$$

2. $\lim\limits_{x\to 1} \dfrac{\sqrt{x}-1}{x-1} = \lim\limits_{x\to 1} \dfrac{\sqrt{x}-1}{x-1} \cdot \dfrac{\sqrt{x}+1}{\sqrt{x}+1} = \lim\limits_{x\to 1} \dfrac{x+\sqrt{x}-\sqrt{x}-1}{(x-1)(\sqrt{x}+1)}$

getting $\frac{0}{0}$

$$= \lim_{x\to 1} \frac{\cancel{x-1}}{(\cancel{x-1})(\sqrt{x}+1)} = \lim_{x\to 1} \frac{1}{\sqrt{x}+1} = \frac{1}{\sqrt{1}+1}$$

$$= \frac{1}{1+1} = \boxed{\frac{1}{2}}$$

3. $\lim\limits_{x\to 2^-} \dfrac{|x-2|}{4x-8} = \lim\limits_{x\to 2^-} \dfrac{-(x-2)}{4x-8} = \lim\limits_{x\to 2^-} \dfrac{-\cancel{(x-2)}}{4\cancel{(x-2)}} = \lim\limits_{x\to 2^-} \dfrac{-1}{4}$

$$= \boxed{-\frac{1}{4}}$$

getting $\frac{0}{0}$

$x \longrightarrow 2$

Note: $x-2<0$ so $|x-2| = -(x-2)$

4. $\lim\limits_{x\to 3} \dfrac{\sin\left(\frac{\pi}{x}\right)}{x} = \dfrac{\sin\left(\frac{\pi}{3}\right)}{3} = \dfrac{\frac{\sqrt{3}}{2}}{3} = \boxed{\dfrac{\sqrt{3}}{6}}$

Not $\frac{0}{0}$!