Name: Richard

Quiz 2 ♡

MATH 200
September 1, 2021

1. $\lim_{x\to1} \dfrac{x^2-2x+1}{x^2+x-2} = \lim_{x\to1} \dfrac{(x-1)(x-1)}{(x-1)(x+2)} = \lim_{x\to1} \dfrac{x-1}{x+2} = \dfrac{1-1}{1+2} = \dfrac{0}{3} = \boxed{0}$

getting $\frac{0}{0}$

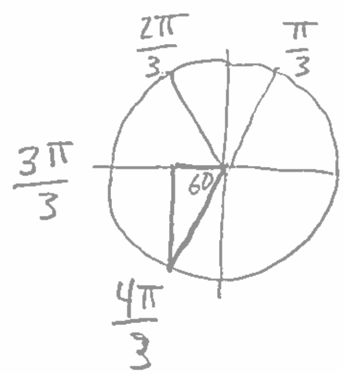
2. $\lim_{x\to4} \dfrac{\frac{1}{x}-\frac{1}{4}}{x-4} = \lim_{x\to4} \dfrac{\frac{1}{x}-\frac{1}{4}}{x-4}\cdot\dfrac{4x}{4x} = \lim_{x\to4} \dfrac{4-x}{(x-4)4x}$

getting $\frac{0}{0}$

$= \lim_{x\to4} \dfrac{-\cancel{(x-4)}}{\cancel{(x-4)}4x}$

$= \lim_{x\to4} \dfrac{-1}{4x} = \dfrac{-1}{4\cdot4} = \boxed{\dfrac{-1}{16}}$

3. $\lim_{x\to4\pi/3} \sin(x) = \sin\left(\dfrac{4\pi}{3}\right) = \boxed{-\dfrac{\sqrt{3}}{2}}$



4. $\lim_{x\to\pi} \dfrac{\cos^2(x)-1}{\cos(x)+1} = \lim_{x\to\pi} \dfrac{\cancel{(\cos(x)+1)}(\cos(x)-1)}{\cancel{\cos(x)+1}} = \lim_{x\to\pi} (\cos(x)-1)$

getting $\frac{0}{0}$

$= \cos(\pi)-1$

$= -1-1$

$= \boxed{-2}$

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QUIZ 2 ♠

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1. $\lim\limits_{x\to -5} \frac{x+5}{x^2+3x-10} = \lim\limits_{x\to -5} \frac{\cancel{x+5}}{(\cancel{x+5})(x-2)} = \lim\limits_{x\to -5} \frac{1}{x-2} = \frac{1}{-5-2}$

$= \boxed{\frac{-1}{7}}$

getting $\frac{0}{0}$

2. $\lim\limits_{h\to 0} \frac{\sqrt{5+h}-\sqrt{5}}{h} = \lim\limits_{h\to 0} \frac{\sqrt{5+h}-\sqrt{5}}{h} \cdot \frac{\sqrt{5+h}+\sqrt{5}}{\sqrt{5+h}+\sqrt{5}}$

getting $\frac{0}{0}$

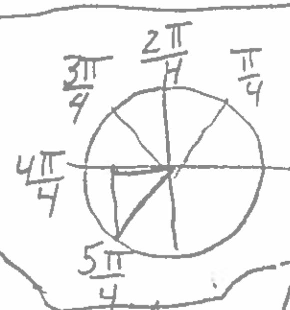
$= \lim\limits_{h\to 0} \frac{\sqrt{5+h}^2 - \sqrt{5+h}\sqrt{5} + \sqrt{5}\sqrt{5+h} - \sqrt{5}^2}{h(\sqrt{5+h}+\sqrt{5})}$

$= \lim\limits_{h\to 0} \frac{(5+h)-5}{h(\sqrt{5+h}+\sqrt{5})} = \lim\limits_{h\to 0} \frac{\cancel{h}}{\cancel{h}(\sqrt{5+h}+\sqrt{5})}$

$= \lim\limits_{h\to 0} \frac{1}{\sqrt{5+h}+\sqrt{5}} = \frac{1}{\sqrt{5+0}+\sqrt{5}} = \boxed{\frac{1}{2\sqrt{5}}}$

3. $\lim\limits_{x\to 5\pi/4} \sin(x) = \sin\left(\frac{5\pi}{4}\right)$

$= \boxed{-\frac{\sqrt{2}}{2}}$



4. $\lim\limits_{x\to \pi/2} \frac{\sin(x)-1}{2-2\sin(x)} = \lim\limits_{x\to \frac{\pi}{2}} \frac{\cancel{\sin(x)-1}}{-2(\cancel{\sin(x)-1})} = \lim\limits_{x\to \frac{\pi}{2}} \left(-\frac{1}{2}\right) = \boxed{-\frac{1}{2}}$

$\frac{\sin\left(\frac{\pi}{2}\right)-1}{2-2\sin\left(\frac{\pi}{2}\right)} = \frac{1-1}{2-2} = \frac{0}{0}$

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

getting $\frac{0}{0}$

2. $\lim_{h\to 0} \frac{\frac{1}{5+h} - \frac{1}{5}}{h} = \lim_{h\to 0} \frac{\frac{1}{5+h} - \frac{1}{5}}{h} \frac{5(5+h)}{5(5+h)}$

getting $\frac{0}{0}$

$= \lim_{h\to 0} \frac{5-(5+h)}{h\,5(5+h)}$

$= \lim_{h\to 0} \frac{-\cancel{h}}{\cancel{h}\,5(5+h)} = \lim_{h\to 0} \frac{-1}{5(5+h)}$

$= \frac{-1}{5(5+0)} = \boxed{\frac{-1}{25}}$

3. $\lim_{x\to \pi/3} \sin(x) = \sin\left(\pi/3\right) = \boxed{\frac{\sqrt{3}}{2}}$

4. $\lim_{x\to \pi} \frac{\cos(x)+1}{\cos^2(x)-1} = \lim_{x\to \pi} \frac{\cancel{\cos(x)+1}}{(\cos(x)-1)\cancel{(\cos(x)+1)}} = \lim_{x\to \pi} \frac{1}{\cos(x)-1}$

getting $\frac{0}{0}$

$= \frac{1}{\cos(\pi)-1} = \frac{1}{-1-1} = \boxed{-\frac{1}{2}}$

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Quiz 2 ♣

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1. $\lim_{x\to 2} \frac{x^2-4}{x^2+3x-10} = \lim_{x\to 2} \frac{\cancel{(x-2)}(x+2)}{\cancel{(x-2)}(x+5)} = \lim_{x\to 2} \frac{x+2}{x+5} = \frac{2+2}{2+5} = \boxed{\frac{4}{7}}$

getting $\frac{0}{0}$

2. $\lim_{x\to 3} \frac{\sqrt{x}-\sqrt{3}}{x-3} = \lim_{x\to 3} \frac{\sqrt{x}-\sqrt{3}}{x-3} = \lim_{x\to 3} \frac{\sqrt{x}-\sqrt{3}}{x-3} \frac{\sqrt{x}+\sqrt{3}}{\sqrt{x}+\sqrt{3}}$

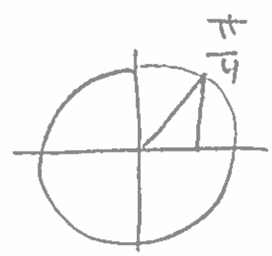
getting $\frac{0}{0}$

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

$$= \lim_{x\to 3} \frac{\cancel{x-3}}{\cancel{(x-3)}(\sqrt{x}+\sqrt{3})}$$

$$= \lim_{x\to 3} \frac{1}{\sqrt{x}+\sqrt{3}} = \frac{1}{\sqrt{3}+\sqrt{3}} = \boxed{\frac{1}{2\sqrt{3}}}$$

3. $\lim_{x\to \pi/4} \sin(x) = \sin\left(\frac{\pi}{4}\right) = \boxed{\frac{\sqrt{2}}{2}}$



4. $\lim_{x\to \pi/2} \frac{x - x\sin(x)}{\sin(x)-1} = \lim_{x\to \frac{\pi}{2}} \frac{x(1-\sin(x))}{\sin(x)-1} = \lim_{x\to \frac{\pi}{2}} \frac{-x\cancel{(\sin(x)-1)}}{\cancel{\sin(x)-1}}$

$$= \lim_{x\to \frac{\pi}{2}} (-x) = \boxed{-\frac{\pi}{2}}$$