Name: Richard

QUIZ 2 ♡

MATH 200

January 20, 2026

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

getting $\frac{0}{0}$

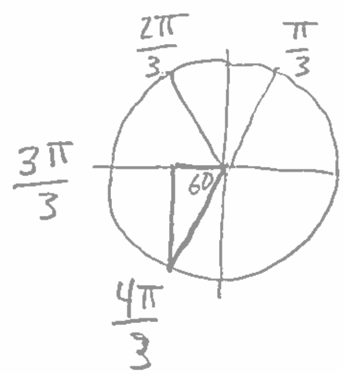
2. $\lim_{x\to 4} \frac{\frac{1}{x}-\frac{1}{4}}{x-4} = \lim_{x\to 4} \frac{\frac{1}{x}-\frac{1}{4}}{x-4}\cdot\frac{4x}{4x} = \lim_{x\to 4} \frac{4-x}{(x-4)4x}$

getting $\frac{0}{0}$

$= \lim_{x\to 4} \frac{-\cancel{(x-4)}}{\cancel{(x-4)}4x}$

$= \lim_{x\to 4} \frac{-1}{4x} = \frac{-1}{4\cdot 4} = \boxed{-\frac{1}{16}}$

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



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

getting $\frac{0}{0}$

$= \cos(\pi)-1$

$= -1-1$

$= \boxed{-2}$

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

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

getting $\frac{0}{0}$

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

getting $\frac{0}{0}$

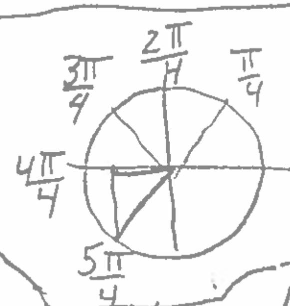
$= \lim\limits_{h\to 0} \dfrac{\sqrt{5+h}^2 - \sqrt{5+h}\sqrt{5} + \sqrt{5}\sqrt{5+h} - \sqrt{5}^2}{h(\sqrt{5+h}+\sqrt{5})}$

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

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

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

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



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

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

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1. $\lim\limits_{x\to 1} \dfrac{x^2-1}{x^2+x-2} = \lim\limits_{x\to 1} \dfrac{\cancel{(x-1)}(x+1)}{\cancel{(x-1)}(x+2)} = \lim\limits_{x\to 1} \dfrac{x+1}{x+2} = \dfrac{1+1}{1+2} = \boxed{\dfrac{2}{3}}$

getting $\frac{0}{0}$

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

getting $\frac{0}{0}$

$= \lim\limits_{h\to 0} \dfrac{5-(5+h)}{h\,5(5+h)}$

$= \lim\limits_{h\to 0} \dfrac{-\cancel{h}}{\cancel{h}\,5(5+h)} = \lim\limits_{h\to 0} \dfrac{-1}{5(5+h)}$

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

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

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

getting $\frac{0}{0}$

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

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

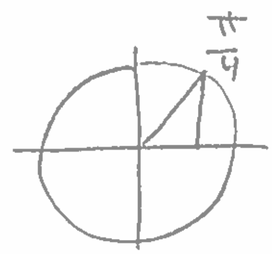
getting $\frac{0}{0}$

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

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

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

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



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

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