Name: Richard

QUIZ 2 ♡

MATH 200
August 31, 2022

1. $\lim\limits_{h\to 0} \dfrac{\sqrt{4+h}-2}{h} = \lim\limits_{h\to 0} \dfrac{\sqrt{4+h}-2}{h}\cdot\dfrac{\sqrt{4+h}+2}{\sqrt{4+h}+2}$

getting $\frac{0}{0}$ so try to cancel the denominator

$$= \lim_{h\to 0} \frac{\sqrt{4+h}^2 + \sqrt{4+h}\cdot 2 - 2\sqrt{4+h} - 2^2}{h(\sqrt{4+h}+2)}$$

$$= \lim_{h\to 0} \frac{4+h-4}{h(\sqrt{4+h}+2)} = \lim_{h\to 0} \frac{\cancel{h}}{\cancel{h}(\sqrt{4+h}+2)}$$

$$= \lim_{h\to 0} \frac{1}{\sqrt{4+h}+2} = \frac{1}{\sqrt{4+0}+2} = \frac{1}{2+2} = \boxed{\frac{1}{4}}$$

2. $\lim\limits_{x\to 5} \dfrac{\frac{10}{x}-2}{x-5} = \lim\limits_{x\to 5} \dfrac{\frac{10}{x}-2}{x-5}\cdot\dfrac{x}{x} = \lim\limits_{x\to 5} \dfrac{10-2x}{(x-5)x}$

getting $\frac{0}{0}$ so try to cancel the denominator

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

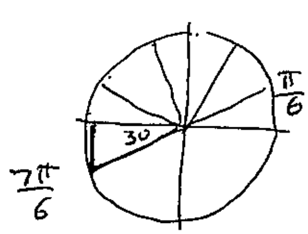
$$= \boxed{\frac{-2}{5}}$$

3. $\lim\limits_{x\to 3} \dfrac{21-7x}{2x-6} = \lim\limits_{x\to 3} \dfrac{7(3-x)}{2(x-3)} = \lim\limits_{x\to 3} \dfrac{-7\cancel{(x-3)}}{2\cancel{(x-3)}} =$

getting $\frac{0}{0}$ so try to cancel denominator

$$= \lim_{x\to 3}\left(-\frac{7}{2}\right) = \boxed{\frac{-7}{2}}$$

4. $\lim\limits_{x\to 7\pi/6} \tan(x) = \tan\left(\frac{7\pi}{6}\right) = \dfrac{\sin\left(\frac{7\pi}{6}\right)}{\cos\left(\frac{7\pi}{6}\right)} = \dfrac{-\frac{1}{2}}{-\frac{\sqrt{3}}{2}} = \boxed{\frac{1}{\sqrt{3}}}$



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Quiz 2 ♢

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1. $\lim\limits_{x\to 9}\dfrac{\sqrt{x}-3}{x-9} = \lim\limits_{x\to 9}\dfrac{\sqrt{x}-3}{x-9}\cdot\dfrac{\sqrt{x}+3}{\sqrt{x}+3} = \lim\limits_{x\to 9}\dfrac{\sqrt{x}^2+\sqrt{x}\cdot 3-3\cdot\sqrt{x}-3^2}{(x-9)(\sqrt{x}+3)}$

getting $\frac{0}{0}$, so try to cancel the denominator

$$= \lim_{x\to 9}\frac{\cancel{x-9}}{\cancel{(x-9)}(\sqrt{x}+3)}$$

$$= \lim_{x\to 9}\frac{1}{\sqrt{x}+3} = \frac{1}{\sqrt{9}+3}$$

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

2. $\lim\limits_{h\to 0}\dfrac{\frac{6}{6+h}-1}{h} = \lim\limits_{h\to 0}\dfrac{\frac{6}{6+h}-1}{h}\cdot\dfrac{6+h}{6+h} = \lim\limits_{h\to 0}\dfrac{6-(6+h)}{h(6+h)}$

getting $\frac{0}{0}$, so try to cancel the denominator

$$= \lim_{h\to 0}\frac{-\cancel{h}}{\cancel{h}(6+h)}$$

$$= \lim_{h\to 0}\frac{-1}{6+h}$$

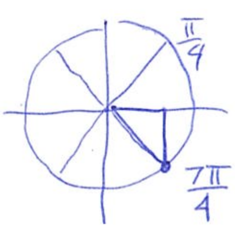
$$= \frac{-1}{6+0} = \boxed{-\frac{1}{6}}$$

3. $\lim\limits_{x\to 3}\dfrac{9-x^2}{2x^2-18} = \lim\limits_{x\to 3}\dfrac{(3-x)(3+x)}{2(x^2-9)} = \lim\limits_{x\to 3}\dfrac{\overset{(-1)}{\cancel{(3-x)}}\cancel{(3+x)}}{2\cancel{(x-3)}\cancel{(x+3)}}$

getting $\frac{0}{0}$ so try to cancel

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

4. $\lim\limits_{x\to 7\pi/4}\sec(x) = \sec\left(\dfrac{7\pi}{4}\right) = \dfrac{1}{\cos\left(\frac{7\pi}{4}\right)} = \dfrac{1}{\frac{\sqrt{2}}{2}} = \dfrac{2}{\sqrt{2}} = \dfrac{2}{\sqrt{2}}\dfrac{\sqrt{2}}{\sqrt{2}}$



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

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1. $\displaystyle\lim_{h\to 0}\frac{\frac{1}{6+h}-\frac{1}{6}}{h} =$ $\displaystyle\lim_{h\to 0}\frac{\frac{1}{6+h}-\frac{1}{6}}{h}\cdot\frac{6(6+h)}{6(6+h)} = \lim_{h\to 0}\frac{6-(6+h)}{h\cdot 6(6+h)}$

getting $\frac{0}{0}$, so try to cancel the denominator

$\displaystyle = \lim_{h\to 0}\frac{-\cancel{h}}{\cancel{h}\cdot 6(6+h)}$

$\displaystyle = \lim_{h\to 0}\frac{-1}{6(6+h)} = \frac{-1}{6(6+0)}$

$\displaystyle = \boxed{\frac{-1}{36}}$

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

getting $\frac{0}{0}$ so try to cancel the denominator

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

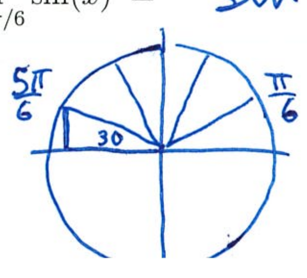
$\displaystyle = \lim_{x\to 3}\frac{3\cancel{(x-3)}}{\cancel{(x-3)}(\sqrt{3x}+3)}$

$\displaystyle = \lim_{x\to 3}\frac{3}{\sqrt{3x}+3} = \frac{3}{\sqrt{9}+3} = \frac{3}{6} = \boxed{\frac{1}{2}}$

3. $\displaystyle\lim_{x\to 6}\frac{60-10x}{2x-12} =$ $\displaystyle\lim_{x\to 6}\frac{10\overset{(-1)}{\cancel{(6-x)}}}{2\cancel{(x-6)}} = \lim_{x\to 6}\frac{10}{2}(-1) = \boxed{-5}$

getting $\frac{0}{0}$ so try to cancel the denominator

4. $\displaystyle\lim_{x\to 5\pi/6}\sin(x) =$ $\sin\left(\frac{5\pi}{6}\right) = \boxed{\frac{1}{2}}$



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1. $$\lim_{x\to3}\frac{\frac{4}{x}-\frac{4}{3}}{x-3} = \lim_{x\to3}\frac{\frac{4}{x}-\frac{4}{3}}{x-3}\cdot\frac{3x}{3x} = \lim_{x\to3}\frac{12-4x}{(x-3)\cdot 3x}$$

getting $\frac{0}{0}$ so try to cancel the denominator

$$= \lim_{x\to3}\frac{4(\cancel{3-x})^{(-1)}}{(\cancel{x-3})\cdot 3x} = \lim_{x\to3}\frac{4(-1)}{3x}$$

$$= \frac{-4}{3\cdot3} = \boxed{-\frac{4}{9}}$$

2. $$\lim_{h\to0}\frac{\sqrt{7+h}-\sqrt{7}}{h} = \lim_{h\to0}\frac{\sqrt{7+h}-\sqrt{7}}{h}\cdot\frac{\sqrt{7+h}+\sqrt{7}}{\sqrt{7+h}+\sqrt{7}}$$

getting $\frac{0}{0}$ so try to cancel the denominator

$$= \lim_{h\to0}\frac{\sqrt{7+h}^2+\sqrt{7+h}\sqrt{7}-\sqrt{7}\sqrt{7+h}-\sqrt{7}^2}{h(\sqrt{7+h}+\sqrt{7})}$$

$$= \lim_{h\to0}\frac{7+h-7}{h(\sqrt{7+h}+\sqrt{7})} = \lim_{h\to0}\frac{\cancel{h}}{\cancel{h}(\sqrt{7+h}+\sqrt{7})}$$

$$= \lim_{h\to0}\frac{1}{\sqrt{7+h}+\sqrt{7}} = \frac{1}{\sqrt{7+0}+\sqrt{7}} = \frac{1}{\sqrt{7}+\sqrt{7}} = \boxed{\frac{1}{2\sqrt{7}}}$$

3. $$\lim_{x\to4}\frac{5\sqrt{x}-10}{2-\sqrt{x}} = \lim_{x\to4}\frac{5(\cancel{\sqrt{x}-2})^{(-1)}}{(\cancel{2-\sqrt{x}})} = \lim_{x\to4}(-5) = \boxed{-5}$$

getting $\frac{0}{0}$ so try to cancel the denominator

4. $$\lim_{x\to5\pi/3}\sin(x) = \sin\left(\frac{5\pi}{3}\right) = \boxed{-\frac{\sqrt{3}}{2}}$$