September 5, 2025

Be Late for Something Day

Today in History:

Sam Houston elected as president of Texas (1836)

Crazy Horse killed (1877)

Number of the Day: 4220

4220 = 2 x 2 x 5 x 211

4220 is the maximum number of regions the plane is divided into by 38 triangles.

Fun Fact:

In 1900 backstroke was included as an Olympic Event.

Quote of the Day:

"The way to get started is to quit talking and begin doing."

Walt Disney

Today's Weather:

Partly cloudy and windy, High 77^{o}.

Math 121

Quiz #6

Find the value of c so that $f(x)$ is continuous.

$$f(x) = \begin{cases} x^2 - c & \text{if} \quad x < 5 \\ \underline{4x + 2c} & \text{if} \quad x \geq 5 \end{cases}$$

$f(5) = 20 + 2C$

$\lim_{x \to 5^-} f(x) = 25 - C$

$\lim_{x \to 5^+} f(x) = 20 + 2C$

$25 - C = 20 + 2C$

$5 = 3C$

$\boxed{C = \frac{5}{3}}$

Pg 88 # 51

$f(x) = \frac{\cos(x^2)}{x^2 - 1}$ $\quad \underline{x \neq \pm 1}$

Pg 88 # 35

$f(x) = \tan(\sin x)$

$x = \frac{\pi}{2}, -\frac{\pi}{2}, \frac{3\pi}{2}, -\frac{3\pi}{2} \ldots$

$-1 \le \sin x \le 1$

CONT. EVERY WHERE.

COMPUTING LIMITS

① $\lim_{x \to 3} (x^2 + 4x + 5) = 26$

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

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

$= 4$

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

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

$= \frac{1}{-3} = -\frac{1}{3}$

⑥ $\lim_{x \to 3} \frac{\frac{1}{x} - \frac{1}{3}}{x-3} = \lim_{x \to 3} \frac{\frac{3-x}{3x}}{x-3}$

$$= \lim_{x \to 3} \frac{-\cancel{(x-3)}}{(3x)\cancel{(x-3)}} = \lim_{x \to 3} \frac{-1}{3x} = -\frac{1}{9}$$

(7) $$\lim_{x \to 4} \frac{x-4}{\sqrt{x}-2} \left(\frac{\sqrt{x}+2}{\sqrt{x}+2} \right)$$

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

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

(9) $$\lim_{x \to 1} \left(\frac{1}{1-x} - \frac{2}{1-x^2} \right)$$

$$\lim_{x \to 1} \left(\frac{1}{1-x} \left(\frac{1+x}{1+x} \right) - \frac{2}{1-x^2} \right)$$

$$= \lim_{x \to 1} \left(\frac{1+x}{(1-x^2)} - \frac{2}{1-x^2} \right)$$

$$= \lim_{x \to 1} \frac{1+x-2}{1-x^2} = \lim_{x \to 1} \frac{x-1}{1-x^2}$$

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

(10) $$\lim_{x \to 0} \frac{\sin x}{\tan x} = \lim_{x \to 0} \frac{\sin x}{\frac{\sin x}{\cos x}}$$

$$= \lim_{x \to 0} \frac{\cancel{\sin x}}{\cancel{\sin x}} \cdot \frac{\cos x}{1} = 1$$

11) $$\lim_{x \to \frac{\pi}{2}} (\sec x - \tan x)$$

$$= \lim_{x \to \frac{\pi}{2}} \left(\frac{1}{\cos x} - \frac{\sin x}{\cos x} \right)$$

$$= \lim_{x \to \frac{\pi}{2}} \frac{1 - \sin x}{\cos x} \left(\frac{1 + \sin x}{1 + \sin x} \right)$$

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

$$= \frac{0}{2} = 0$$