

September 4, 2026

National Wildlife Day

Today in History:

George Eastman introduces the Kodak camera (1888)

Larry Page and Sergey Brin incorporated Google (1998)

Number of the Day: 895

895 = 5 x 179

895 is the smallest multiple of five with a digit sum of 22

Fun Fact:

Alaska is the state with the highest percentage of people that walk to work.

Quote of the Day:

"Human history becomes more and more a race between education and catastrophe."

- H. G. Wells

Today's Weather:

Thunderstorms possible after 9:00am, high 77°

Math 121

Quiz #7

Find

$$\lim_{x \rightarrow 4} \frac{x - 4}{\sqrt{x} - \sqrt{8 - x}} \cdot \frac{\sqrt{x} + \sqrt{8 - x}}{\sqrt{x} + \sqrt{8 - x}}$$

$$= \lim_{x \rightarrow 4} \frac{(x - 4)(\sqrt{x} + \sqrt{8 - x})}{x - (8 - x)}$$

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

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

$$= 2$$

$$\lim_{t \rightarrow 2} \frac{2^{2t} + 2^t - 20}{2^t - 4}$$

$$2^{2t} + 2^t - 20 = (2^t)^2 + 2^t - 20$$

$$y = 2^t \Rightarrow y^2 + y - 20$$

$$= (y - 4)(y + 5)$$

$$= (2^t - 4)(2^t + 5)$$

$$\lim_{t \rightarrow 2} \frac{\cancel{(2^t - 4)}(2^t + 5)}{\cancel{2^t - 4}} = 9$$

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

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

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

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

$$\textcircled{3} \quad \lim_{x \rightarrow 0} \frac{(1+x)^2 - 1}{x}$$

$$= \lim_{x \rightarrow 0} \frac{\cancel{1} + \cancel{2x} + x^{\cancel{2}^1} - \cancel{1}}{\cancel{x}}$$

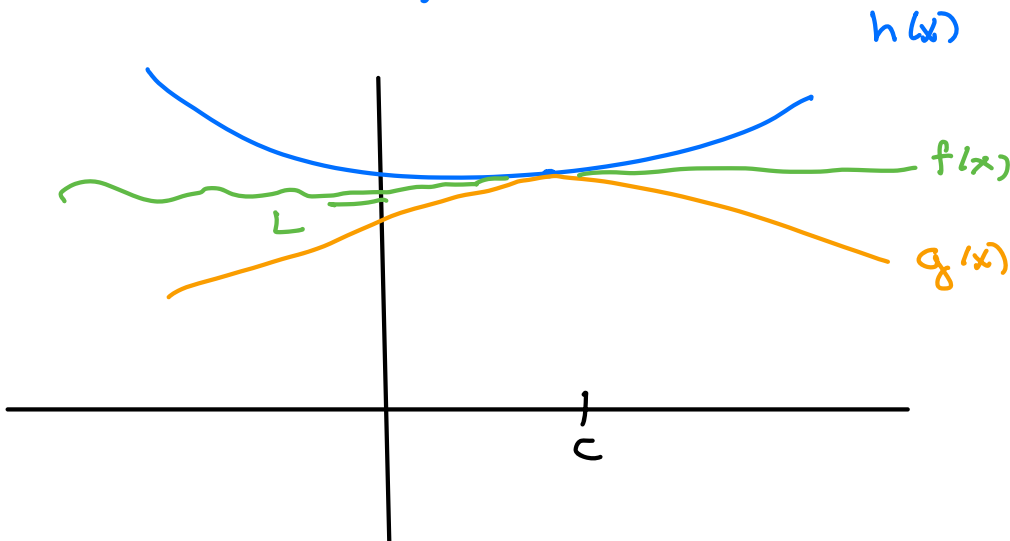
$$= 2$$

SQUEEZE THM / SANDWICH THM

$$g(x) \leq f(x) \leq h(x) \quad x \neq c$$

$$\lim_{x \rightarrow c} g(x) = L \quad \text{AND} \quad \lim_{x \rightarrow c} h(x) = L$$

$$\text{Then } \lim_{x \rightarrow c} f(x) = L$$

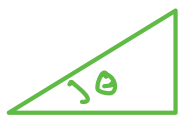
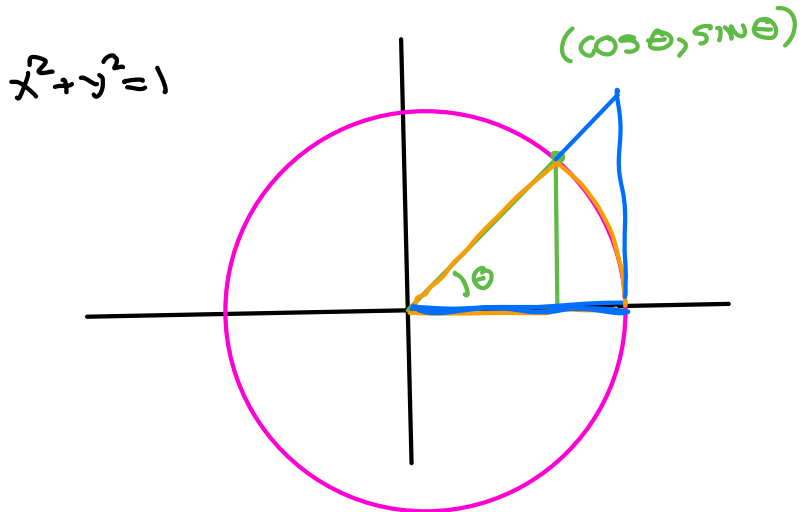
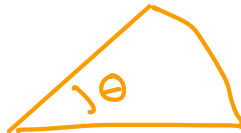
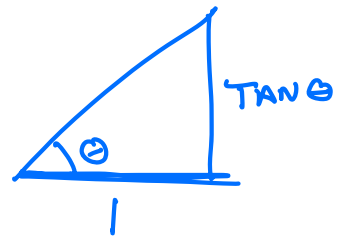


$$\lim_{x \rightarrow 0} x \sin\left(\frac{1}{x}\right) = 0$$

$$-1 \leq \sin\left(\frac{1}{x}\right) \leq 1$$

$$-x \leq x \sin\left(\frac{1}{x}\right) \leq x$$




 $\approx$

 $\approx$


$$\frac{1}{2} \cos \theta \sin \theta$$

$$A = \frac{\theta}{2}$$

$$A = \frac{1}{2} \tan \theta$$

$$\frac{\theta}{2\pi} = \frac{A}{\pi}$$

$$\frac{1}{2} \cos \theta \sin \theta \approx \frac{\theta}{2} \approx \frac{\tan \theta}{2}$$

$$\frac{\cos \theta \sin \theta}{\sin \theta} \leq \frac{\theta}{\sin \theta} \leq \frac{\sin \theta}{\cos \theta \sin \theta}$$

$$\lim_{\theta \rightarrow 0} \left(\cos \theta \leq \frac{\theta}{\sin \theta} \leq \frac{1}{\cos \theta} \right)$$



$$\lim_{\theta \rightarrow 0} \frac{\theta}{\sin \theta} = 1$$

$$\lim_{\theta \rightarrow 0} \frac{\sin \theta}{\theta} = 1$$

$$\lim_{x \rightarrow 0} \frac{\sin x}{x} = 1$$

$$\lim_{y \rightarrow 0} \frac{\sin y}{y} = 1$$

$$\lim_{\text{dog} \rightarrow 0} \frac{\sin \text{dog}}{\text{dog}} = 1$$

$$\textcircled{1} \lim_{x \rightarrow 0} \left(\frac{\sin 3x}{3x} \right) \cdot 3 = 3$$

$$\textcircled{2} \lim_{x \rightarrow 0} \frac{1 - \cos x}{x} \left(\frac{1 + \cos x}{1 + \cos x} \right)$$

$$= \lim_{x \rightarrow 0} \frac{1 - \cos^2 x}{x(1 + \cos x)} = \lim_{x \rightarrow 0} \frac{\sin^2 x}{x(1 + \cos x)}$$

$$= \lim_{x \rightarrow 0} \frac{\sin x}{x} \cdot \frac{\sin x}{1} \cdot \frac{1}{1 + \cos x}$$

$\downarrow$ $\downarrow$ $\frac{1}{2}$ $= 0$
 $1 \cdot 0 \cdot \frac{1}{2}$

$$\textcircled{3} \lim_{x \rightarrow 0} \frac{\sin 2x \sin 3x}{x^2}$$

$$= \lim_{x \rightarrow 0} \frac{\sin 2x}{2x} \cdot \frac{\sin 3x}{3x} \cdot 2 \cdot 3 = 6$$

$\downarrow$ $\downarrow$
 $1 \cdot 1$

$$\textcircled{4} \lim_{x \rightarrow 0} \frac{\sec x - 1}{x \sec x} = \lim_{x \rightarrow 0} \frac{\frac{1}{\cos x} - 1}{x \frac{1}{\cos x}} \left(\frac{\cos x}{\cos x} \right)$$

$$= \lim_{x \rightarrow 0} \frac{1 - \cos x}{x} = 0$$

$$\textcircled{5} \lim_{x \rightarrow 0} \frac{x}{\tan(5x)} = \lim_{x \rightarrow 0} \frac{x}{\frac{\sin(5x)}{\cos(5x)}}$$

$$= \lim_{x \rightarrow 0} \frac{5x}{\sin(5x)} \cdot \frac{\cos(5x)}{1} \cdot \frac{1}{5} = \frac{1}{5}$$

$\downarrow$ $\downarrow$ $\frac{1}{5}$
 $1 \cdot 1 \cdot \frac{1}{5}$