

3 Strikes Yer Out!

1ST TRY... 3 POINTS
2ND TRY... 2 POINTS
3RD TRY... High five!

Worksheet A - 2.1



Group Members:

$$1. \lim_{x \rightarrow -2} \frac{x^2 + 1}{3x^2 - 2x + 5} = \frac{(-2)^2 + 1}{3(-2)^2 - 2(-2) + 5} = \boxed{\frac{5}{21}}$$

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

$$3. \lim_{x \rightarrow 0} (e^x \sin x) = e^0 \cdot \sin 0 = 1 \cdot 0 = \boxed{0}$$

$$4. \lim_{x \rightarrow 1} \frac{x^2 - 1}{2x^2 - x - 1} = \lim_{x \rightarrow 1} \frac{(x-1)(x+1)}{(2x+1)(x-1)} = \lim_{x \rightarrow 1} \frac{x+1}{2x+1} = \boxed{\frac{2}{3}}$$

$$5. \lim_{x \rightarrow 0} \frac{\tan x}{x} = \lim_{x \rightarrow 0} \frac{\frac{\sin x}{\cos x}}{x} = \lim_{x \rightarrow 0} \frac{\sin x}{x} \cdot \lim_{x \rightarrow 0} \frac{1}{\cos x} = 1 \cdot 1 = \boxed{1}$$

$$6. \lim_{x \rightarrow 4} \sqrt{1-2x} = \sqrt{1-2(4)} = \sqrt{-7} = \boxed{DNE}$$

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Worksheet B - 2.2



Group Members:

$$1. \lim_{x \rightarrow -\infty} \frac{2x^2 + 3}{5x^2 + 7} = \lim_{x \rightarrow -\infty} \frac{2x^2}{5x^2} = \boxed{\frac{2}{5}}$$

$$2. \lim_{x \rightarrow \infty} \frac{x}{e^x} = \boxed{0}$$

$$3. \lim_{x \rightarrow \infty} \frac{x^3 - 4x^2 + 3x + 3}{x - 3} = \lim_{x \rightarrow \infty} \frac{x^3}{x} = \lim_{x \rightarrow \infty} x^2 = \boxed{\infty}$$

$$4. \lim_{x \rightarrow -\infty} \frac{5 - x^4}{x^3 + 2} = \lim_{x \rightarrow -\infty} \frac{-x^4}{x^3} = \lim_{x \rightarrow -\infty} -x = \boxed{\infty}$$

5. Find the vertical asymptote(s) and use limits to describe the behavior to the left and right of the asymptote(s).

$$f(x) = \frac{x+3}{2-x}$$

$$V.A.: x = 2$$

$$\lim_{x \rightarrow 2^+} f(x) = -\infty$$

$$\lim_{x \rightarrow 2^-} f(x) = \infty$$

6. Find a right and left end behavior model for the function.

$$f(x) = -3x + e^x$$

$$R.E.B.M.: e^x$$

$$L.E.B.M.: -3x$$

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Worksheet C - 2.3



Group Members:

1. What are the 3 different types of discontinuity?

Infinite, removable, jump

2. Find all discontinuities of the function and give what type each is:

$$f(x) = \frac{5x^2 - 13x - 6}{3x^2 - 5x - 12} = \frac{(5x + 2)(x - 3)}{(3x + 4)(x - 3)}$$

Infinite disc.: $x = -\frac{4}{3}$

Remov. disc.: $x = 3$

3. Is the function continuous or not? Explain why or why not.

$$f(x) = \begin{cases} x^2 + 5, & x \geq 1 \\ 12x - 5, & x < 1 \end{cases}$$

$\lim_{x \rightarrow 1^+} f(x) = 6$
 $\lim_{x \rightarrow 1^-} f(x) = 7$

Not continuous, since $\lim_{x \rightarrow 1} f(x)$ DNE.

4. Find the value(s) of "c" such that f(x) is continuous at x=2.

$$f(x) = \begin{cases} c^2x + 5, & x \geq 2 \\ x + 8, & x < 2 \end{cases}$$

$$c^2 \cdot 2 + 5 = 2 + 8$$

$$2c^2 + 5 = 10$$

$$2c^2 = 5$$

$$c^2 = \frac{5}{2}$$

$$c = \pm \sqrt{\frac{5}{2}}$$

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Worksheet D - 2.4



Group Members:

1. Find the average rate of change of $f(x) = x^3 + 2$ over $[2, 5]$.

$$\begin{aligned} \text{avg. rate of change} &= \frac{f(5) - f(2)}{5 - 2} = \frac{127 - 10}{3} = \frac{117}{3} \\ &= \boxed{39} \end{aligned}$$

2. Find the slope of the curve $f(x) = \frac{1}{1-x}$ at $x = 4$.

$$\begin{aligned} \lim_{h \rightarrow 0} \frac{f(4+h) - f(4)}{h} &= \lim_{h \rightarrow 0} \frac{\frac{1}{-3-h} + \frac{1}{+3}}{h} = \lim_{h \rightarrow 0} \frac{\frac{3+3-h}{3(-3-h)}}{h} \\ &= \lim_{h \rightarrow 0} \frac{-h}{3(-3-h)} = \lim_{h \rightarrow 0} \frac{-1}{3(-3-h)} = \frac{-1}{-9} = \boxed{\frac{1}{9}} \end{aligned}$$

3. Find the equation of the normal line of $f(x) = x^2 + 3x + 5$ at $x = -2$.

$$\begin{aligned} \lim_{h \rightarrow 0} \frac{f(-2+h) - f(-2)}{h} &= \lim_{h \rightarrow 0} \frac{(-2+h)^2 + 3(-2+h) + 5 - 3}{h} \\ &= \lim_{h \rightarrow 0} \frac{4 - 4h + h^2 - 6 + 3h + 5 - 3}{h} = \lim_{h \rightarrow 0} \frac{h^2 - h}{h} \\ &= \lim_{h \rightarrow 0} \frac{h(h-1)}{h} = -1 \end{aligned}$$

$m = 1 \leftarrow \text{normal}$

$$\boxed{y - 3 = x + 2}$$

Names:

Worksheet	1 st Attempt – 3 points	2 nd Attempt – 2 points	3 rd Attempt – HIGH FIVE!
A			
B			
C			
D			
Total Points			

3 Strikes Yer Out Rules

- 1) Each worksheet has 3-6 problems. After you are done, bring up the one you finished for grading.
- 2) You must *work together* so that each group member is at the same pace.

****Note: Hitchhiking is illegal in Calculus!!****

- 3) When your **whole group** is finished with the worksheet, one person should bring **ALL** worksheets to check with me. Bring your *score sheet* with you!!

4) Scoring:

- If your group gets **ALL** problems correct the first time, you will receive 3 points (to be written on the score sheet).
- Otherwise, you will have to take your sheet, go back, and correct them....on the second time, you will receive 2 points.
-on the third time...it's a HIGH FIVE FOR YOU!!

Good Luck!!