

**Multiple Choice**

Show all work neatly organized that leads to the solution in order to receive FULL credit. Be sure to check and mark your answers.

- 1 Find the limit of the function, if it exists, by completing the table.

$$f(x) = \frac{\sin 15x}{5x}$$

$x$	-1	-0.1	-0.01	0	.001	.01	.1
$f(x)$							

$$\lim_{x \rightarrow 0} f(x) =$$

- 2 Find the limit of the function, if it exists.

$$f(x) = \begin{cases} -\frac{5x}{2}, & x < 2 \\ \frac{3}{2}x - 5, & x \geq 2 \end{cases}$$

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

- 3 Find the limit of the function.

$$\lim_{x \rightarrow c} f(x) = 5, \quad \lim_{x \rightarrow c} g(x) = 17$$

(a)  $\lim_{x \rightarrow c} [f(x) - g(x)]^2$

(b)  $\lim_{x \rightarrow c} [13g(x) - 26f(x)]$

- 4 Find the limit of the function, if it exists.

$$\lim_{x \rightarrow 5} \frac{x^2 - 13x + 40}{x - 5}$$

- 5 Find the limit of the function, if it exists.

$$\lim_{x \rightarrow 4} \frac{x - 4}{x^2 + 5x + 4}$$

- 6 Find the limit of the function, if it exists.

$$\lim_{x \rightarrow 3} \frac{\sqrt{3} - \sqrt{6 - x}}{x - 3}$$

7 Find the derivative,  $f'(x)$ , of the given function.

$$f(x) = \frac{5}{2}x^2 + 17$$

8 Find the slope of the tangent line through the point (3, 5).

$$f(x) = x^2 - 4$$

9 Find the limit, if it exists. If it does not exist explain why.

$$\lim_{x \rightarrow \infty} \left[ \frac{3x^2}{2 - x + 4x^2} - \frac{5x^3}{17x^4 + 91} \right]$$

10 List the first 5 terms of the sequence then find the limit as  $n$  goes to infinity, if it exists. If it does not exist explain why. (start with  $n = 1$ )

$$a_n = \frac{(-2)^n}{n^2}$$

$$\lim_{n \rightarrow \infty} a_n =$$

$n$	$10^0$	$10^1$	$10^2$	$10^3$	$10^4$
$a_n$					

11 Find the limit of the function, if it exists.

$$\lim_{x \rightarrow \infty} \frac{x^2 - 9x + 20}{x - 5 - 3x^2}$$

12 Find the limit of the function, if it exists.

$$\lim_{x \rightarrow \infty} \frac{x - 4}{x^2 - 5x + 4}$$

- 13 Find the limit of the function, if it exists.

$$f(x) = \frac{\sqrt{3} - \sqrt{9x^2 - 9}}{6x - 6}$$

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

<b>x</b>	$10^0$	$10^1$	$10^2$	$10^3$	$10^4$
<b>f(x)</b>					

- 14 Find the limit of the function, if it exists.

$$\lim_{x \rightarrow \infty} \frac{10x - 14x^9 + 3}{19x^2 + 5x - 7x^6}$$

- 15 Find the limit of the function, if it exists.

$$f(x) = 7x - 5 - \sqrt{49x^2 + 25}$$

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

<b>x</b>	$10^0$	$10^1$	$10^2$	$10^3$	$10^4$
<b>f(x)</b>					

- 16 Find the limit of the function, if it exists.

$$\lim_{x \rightarrow \infty} \frac{9x - 8x^7 + 6x^5 - 4}{3x + 2x^5 - 6x^7 + 8}$$

- 17 Find the derivative,  $f'(x)$ , of the given function.

$$f(x) = x^2 - 5x - 2$$

- 18 Find the slope of the tangent line through the point  $(-3, -13)$ .

$$f(x) = \frac{2}{3}x^3 + 5$$

- 19 Find the limit of the function, if it exists.

$$\lim_{x \rightarrow 2} \frac{3x + 5}{5x - 3}$$

- 20 Find the limit of the function, if it exists.

$$\lim_{x \rightarrow 0} e^{-2/x}$$