Name _____ **DUE DATE:** _____

Directions:

- *Read each problem carefully and use your knowledge of mathematics to determine your answer.*
- *In order to receive FULL CREDIT you must either SHOW ALL WORK or EXPLAIN how you got your answer!! PLEASE NOTE: A multiple choice answer alone without any work will only receive half credit.*

Question	Your Work/Explanation
1) If the graph of $y = \frac{ax+b}{x+c}$ has a horizontal asymptote $y = 2$ and a vertical asymptote $x = -3$, then $a + c =$ (a) 5 (b) -1 (c) 0 (d) 1	
2) If $x + 7y = 29$ is an equation of the line normal to the graph of f at the point (1,4), then $f'(1) =$ (a) 7 (b) $\frac{1}{7}$ (c) $-\frac{1}{7}$ (d) -7	
3) If $y = 2x^4 + 7x^3 - \frac{1}{2}x^2 - 24x - 14$, find y" (a) $y" = 24x^2 + 42x - 1$ (b) $y" = 24x^2 + 42x - 24$ (c) $y" = 8x^2 + 21x - 1$ (d) $y" = 8x^2 + 21x - 24$	

4) Determine $\lim_{x\to\infty}\left(\frac{-2x^3+x}{-4x^5+2x^2+2}\right)$

(a) ∞ (b) 0

(c) $\frac{1}{2}$ (d) nonexistent

5) Let $f(x)=\begin{cases}\frac{4-x^2}{x-2}, & x\neq 2\\ 4, & x=2\end{cases}$. Which of the following statement(s) is/are true?

I. $\lim_{x\to 2} f(x)\ exists$ II. $f(2)\ exists$

III. f is continuous at $x=2$

(a) only I (b) only II

(c) I and II (d) none of them

6) For how many values of x, $0\le x\le 2\pi$, will the tangent lines to $y=4cosx$ and $y=4x$ be parallel?

(a) 0 (b) 1 (c) 2 (d) 3

7) Let $f(x)=\begin{cases}cx+d, x\le 2\\ x^2-cx, x>2\end{cases}$, where c and d are constants. If f is differentiable at $x=2$, what is the value of $c+d$?

(a) -4 (b) -2 (c) 0

(d) 2 (e) 4

8) If $\lim_{x\to a} f(x) = L$ is a real number, which of the following must be true?

(a) $f'(a)$ exists
(b) $f(x)$ is continuous at $x = a$
(c) $f(x)$ is defined at $x = a$
(d) none of the above

9) The function f is continuous on the closed interval [0,2] and has values that are given in the table below. The equation $f(x) = \frac{1}{2}$ must have at least two solutions in the interval [0,2] if $k =$

x	0	1	2
$f(x)$	1	k	2

(a) 0 (b) ½

(c) 1 (d) 2

10) If $f(x) = x^{3/2}$, then $f'(4)$=

(a) -6 (b) -3 (c) 3

(d) 6 (e) 8

11) What is the instantaneous rate of change at $x = 2$ of the fuction f given by $f(x) = \frac{x^2-2}{x-1}$?	
12) Determine the $y - intercept$ of the tangent line to the curve $y = \sqrt{x^2 + 24}$ at $x = 5$.	