Blizzard Bag Assignment #7 Name_____

Calculus Block/Date_____

1. Evaluate: $\lim_{x\to 5}\frac{x^2-25}{x-5}$

A. 0 B. 5 C. 10 D. None of these

2. Evaluate: $\lim_{x\to -2} 6x^2-5x+2$

A. 16 B. -12 C. -32 D. 36

3. All of the following explain a non-existent limit (at x = c) except…

A. f(x) approaches a different number from the right side of c than it approaches from the left side.
B. f(x) is not defined at x = c
C. f(x) increases or decreases without bound as x approaches c
D. f(x) oscillates between two fixed values as x approaches c

4. Name two mathematical problems that require calculus in order to solve them.

A. Constant velocity and the slope of a curve
B. Area of a rectangle and the tangent line to a circle
C. Area under a curve and instantaneous velocity
D. Tangent line to a graph and slope of a line

5. Evaluate: $\lim_{t\to 0}\frac{\sin 3t}{t}$

A. 3 B. 0 C. $\frac{1}{3}$ D Undefined E. ∞

6. Find: $\lim_{x\to 2} 3x^2+5$

A. 41 B. 17 C. 11 D. 0 E. None of these

7. Let $f(x)=\begin{cases} a-3x, & x<2 \\ x^3, & x\geq 2 \end{cases}$

Find the value of a so that the function f is continuous for all real numbers.

A. 8 B. 10 C. -8 D. 14 E. 76 F. None of these

8. If $\lim_{x\to c} f(x) = -\frac{1}{2}$ *and* $\lim_{x\to c} g(x) = \frac{2}{3}$, find $\lim_{x\to c} \frac{f(x)}{g(x)}$

A. $-\frac{1}{3}$ B. $\frac{1}{3}$ C. $-\frac{3}{4}$ D. -3 E. $\frac{3}{4}$ F. None of these

9. Evaluate: $\lim_{x\to 0} \frac{\sin 3x}{2x}$

A. undefined B. 0 C. $\frac{2}{3}$ D. $\frac{3}{2}$ E. 1

10. Evaluate: $\lim_{x\to -1} \frac{x^2+3x+2}{x^2+1}$

A. 0 B. ∞ C. -1 D. Does not exist E. None of these

11. If "a" is a constant, then $\lim_{x\to a^+} \frac{|x-a|}{x-a}$ is… (**Hint:** remember what the graph of $\frac{|x|}{x}$ looks like!)

A. Undefined B. a C. -1 D. 0 E. 1

12. Find $\lim_{x\to 0} \frac{\sqrt{x+4}-2}{x}$

A. 0 B. $\frac{1}{4}$ C. ∞ D. 1 E. None of these

13. Find $\lim_{x\to 2^-} \frac{1}{x-2}$

A. ∞ B. $-\infty$ C. 0 D. $-\frac{1}{4}$ E. None of these

14. Find $\lim_{x\to 0} \left(2+\frac{5}{x^2}\right)$

A. 7 B. 2 C. ∞ D. 0 E. None of these

15. At which values of x is $f(x)=\dfrac{x^2-2x-3}{x-2}$ discontinuous?

A. 2 B. -1, 2, 3 C. 1 D. -1, $\frac{3}{2}$, 2, 3 E. None of these

16. Let $f(x)=\dfrac{1}{x+1}$ *and* $g(x)=x^2-5$. Find all the values of x for which $f(g(x))$ is discontinuous.

A. -1 B. -1, $\pm\sqrt{5}$ C. $\pm\sqrt{5}$ D. -2, 2

17. Determine the value of c so that $f(x)$ is continuous on the entire real line when $f(x)=\begin{cases} x-2, & x\le 5 \\ cx-3, & x>5 \end{cases}$

A. 0 B. $\frac{6}{5}$ C. 1 D. $\frac{5}{6}$ E. None of these

18. Find all vertical asymptotes of $h(x)=\dfrac{2x+3}{2x^2+x-3}$

A. $x=-\frac{3}{2}, x=1$ B. $x=-\frac{3}{2}$ C. x = 1 D. y = 1 E. None of these

19. Find $\lim\limits_{x\to 1}\dfrac{5}{(x-1)^2}$

A. 0 B. $-\infty$ C. $\frac{5}{4}$ D. $+\infty$ E. 5 F. None of these

20. Let $f(x)=\begin{cases} \dfrac{x^2-4}{x+2}, & x<2 \\ \sqrt{x-1}, & x\ge 2 \end{cases}$, which of the following statements **must** be true about $f(x)$

I. $\lim\limits_{x\to 2^-} f(x)$ exists

II. $f(2)$ exists

III. $f(x)$ is continuous at x = 2

A. None B. I. only C. II. only D. I. and II. only E. I, II, and III.

21. If $g(x)=3x^2+4x-7$, find $g'(4)$

A. 57 B. 21 C. 40 D. 28 E. None of these

22. If $y = \tan x - \cot x$, *then* $\dfrac{dy}{dx} =$

A. $\sec x \csc x$ B. $\sec x - \csc x$ C. $\sec x + \csc x$ D. $\sec^2 x - \csc^2 x$ E. $\sec^2 x + \csc^2 x$

23. Let f and g be functions such that $f(2) = 4$, $f'(2) = 6$, $g(2) = 2$, *and* $g'(2) = -5$. If $h(x)$ is the product such that $h(x) = f(x) \bullet g(x)$, *then* $h'(2) =$?

A. -30
B. -8
C. 0
D. 12
E. 32

24. If $y = \dfrac{2x+3}{3x+2}$, *then* $\dfrac{dy}{dx} =$

A. $\dfrac{12x+13}{(3x+2)^2}$ B. $\dfrac{12x-13}{(3x+2)^2}$ C. $\dfrac{5}{(3x+2)^2}$ D. $\dfrac{-5}{(3x+2)^2}$ E. $\dfrac{2}{3}$

25. $\lim\limits_{h \to 0} \dfrac{(\tan x + h) - \tan x}{h} =$?

A. $\tan h$ B. $\sec^2 x$ C. 0 D. $\sec x \tan x$ E. $\dfrac{\pi}{4}$

26. If $f(x) = 2x^2 + 4$, which of the following will calculate the derivative of $f(x)$

A. $\dfrac{\left[2(x+\Delta x)^2 + 4\right] - (2x^2 + 4)}{\Delta x}$ B. $\lim\limits_{\Delta x \to 0} \dfrac{(2x^2 + 4 + \Delta x) - (2x^2 + 4)}{\Delta x}$

C. $\lim\limits_{\Delta x \to 0} \dfrac{\left[2(x+\Delta x)^2 + 4\right] - (2x^2 + 4)}{\Delta x}$ D. $\dfrac{(2x^2 + 4 + \Delta x) - (2x^2 + 4)}{\Delta x}$ E. None of these

27. Differentiate: $y = \dfrac{1 + \cos x}{1 - \cos x}$

A. -1 B. $-2 \csc x$ C. $2 \csc x$ D. $\dfrac{-2 \sin x}{(1 - \cos x)^2}$ E. None of these