Calculus 11/14/2005

Name:_____ ID:_____

1. For the limit $\lim_{x\to 2} \frac{x}{2} = 1$, find the largest δ that "works" for $\epsilon = 0.1$. **Ans:**

2. Let $f(x) = \begin{cases} 2x-1, & x \le 2 \\ x^2 - x, & x > 2 \end{cases}$. Find $\lim_{x\to 2^-} f(x) + f(2) + 3 \lim_{x\to 2^+} f(x)$. **Ans:**

3. Find $\lim_{x\to 4} \frac{\sqrt{x}-2}{x-4}$. **Ans:**

4. Let $f(x) = \begin{cases} x^2, & x < 1 \\ Ax - 3, & x \ge 1 \end{cases}$. Find A given that f is continuout at 1. **Ans:**

5. Find $\lim_{x\to 0} \frac{\tan 3x}{2x^2 + 5x}$. **Ans:**

6. Solve the inequality $\frac{2x-6}{x^2-6x+5} < 0$ for x. **Ans:**

7. Find the rate of change of $y = [x(x+1)]^{-1}$ with respect to x at $x = 2$. **Ans:**

8. Find dy/dx at $x = 2$ if $y = (s+3)^2$, $s = \sqrt{t-3}$, $t = x^2$. **Ans:**

9. If $g(x) = f(x^2+1)$, find $g'(1)$ given that $f'(2) = 3$. **Ans:**

10. Find $\frac{d^2}{dx^2}\left(x^2 \sin 3x\right)$ **Ans:**

11. Find $\frac{d}{dt}\left[t^2 \frac{d}{dt}(t\cos 3t)\right]$ **Ans:**

12. If $x^2 + y^2 = 4$, use implicit differentiation to obtain $\frac{dy}{dx}$ in term of x and y. **Ans:**

13. Find the equation of the tangent line to the curve $x^2 + xy + 2y^2 = 28$ at the point $(-2, -3)$. **Ans:**

14. Find $\frac{d}{dx}\left(\frac{\sqrt{x^2+1}}{x+2}\right)$ **Ans:**

15. A particle is moving along the parabola $y^2 = 4(x+2)$. As it passes through the point $(7, 6)$, its y–coordinate is increasing at the rate of 3 units per second. How fast is the x–coordinate changing at this instance? **Ans:**

16. Estimate $f(5.4)$ given that $f(5) = 1$ and $f'(x) = \sqrt[3]{x^2+2}$. **Ans:**