Derivatives Chapter Review

Directions: Answer each of the following true false questions. Write the entire word on the space provided.

1. _____ The derivative of a function is the slope of the tangent line.
2. _____ The instantaneous rate of change is the slope of a tangent line.
3. _____ The derivative is found by evaluating the equation $f'(x) = \frac{f(x+h)-f(x)}{h}$
4. _____ Every rational function is differentiable for all real numbers.
5. When is a function non-differentiable?
6. What is a derivative? Write a short statement and also include the formula.
7. Explain what the difference quotient represents.
8. Find the average rate of change between $x = -1$ and $x = 3$ for the function $f(x) = 2x - 3x^2$
9. Find the instantaneous rate of change at $x = 1$ for the function $f(x) = \ln x + 3x^2$

Directions: Tell where the following functions are non-differentiable.

10. $f(x) = |x+2| - 3$
11. $g(x) = \dfrac{3x-7}{x^2-2x}$

Directions: Find the derivative of the following functions. *(No simplification is necessary)*

12. $f(x) = \frac{2}{3x} + \frac{x^2}{5} + 2e^3$
13. $g(x) = \frac{3}{\sqrt{x^2-x}}$
14. $h(x) = \left(\frac{7x-5}{9+x}\right)^4$
15. $p(x) = \left(\frac{4-x^2}{2x^3-6x}\right)\sqrt{7+x^2}$
16. $f(x) = 2xe^{-x} - x\ln x$
17. $f(x) = \ln\sqrt[4]{x^3} + e^x - x^2$
18. $f(x) = \dfrac{e^{x^2+1}}{\ln(2x+4)}$
19. $f(x) = \ln\sqrt[3]{\sqrt{x}+3x}$
20. $f(x) = 7^{2^{\ln x^2}}$
21. $f(x) = \dfrac{\sqrt[4]{\ln\left(x^3+3\right)}}{4e^{ex+x^e}}$
22. $f(x) = \left(\dfrac{\ln x}{e^x}\right)^3$
23. $f(x) = \log\left[\ln\left(e^x + x^2\right)\right]$
24. $f(x) = \dfrac{1}{\left(e^{3-x+4x}\right)^5}$
25. $f(x) = \log 5^{3x^2-7}$

Directions: Write the slope of the tangent line at the given point for the following function.

26. $h(x) = \frac{2x-5}{2x-3}$ at $x = 2$
27. $k(x) = x(3x-2)^4$ at $x = 1$
28. $f(x) = 1 + e^x$ at $x = 0$
29. $g(x) = (\ln x)^3$ at $x = e$