

NAME: _____

ASSIGNMENT 7

Dawson College

Course Code: 201-NYA-05 S07

Due: Mar 26th 2010

Instructor: E. Richer

BASIC DERIVATIVES

Complete the following table.

<i>FUNCTION</i> $f(x)$	<i>DERIVATIVE</i> $f'(x)$
x^n ($n \neq 0$)	
k (k , a constant)	
$\sin x$	
$\cos x$	
$\tan x$	
e^x	
$\ln x$	
$\log_a x$	
a^x	
$\arctan x$	
$\arccos x$	
$\arcsin x$	

Before beginning this assignment make sure you know how to use the following rules and methods of differentiation:

1. **Product Rule**
2. **Quotient Rule**
3. **Chain Rule**
4. **Implicit Differentiation**
5. **Logarithmic Differentiation**

UPON HANDING IN THIS ASSIGNMENT, MAKE SURE YOU INCLUDE ALL YOUR WORK AND NOT SIMPLY THE FINAL ANSWERS.

Differentiate the following functions. In the case of implicit differentiation you must isolate the derivative y' and your final answer should only contain x 's and y 's.

1. $f(x) = \sin x \ln(5x)$
2. $f(x) = \log_5(xe^x)$
3. $y = \ln x^4 \sin^2 x$
4. $y = 2^{3x^2}$
5. $y = x^{\cos x}$
6. $y = (\tan x)^{\frac{1}{x}}$
7. $y = \sqrt{x}e^{x^2}(x^2 + 10)^{10}$
8. $y = \frac{1-xe^x}{x+e^x}$
9. $f(x) = 2^{\sin(\pi x)}$
10. $f(x) = x3^{-\frac{1}{x}}$
11. $y = \ln \sin x - \frac{1}{2} \sin^2 x$
12. $y = \sin^{-1}(3x + 2)$
13. $y = \arctan(\sqrt{x^2 - 1})$
14. $f(x) = x \ln(\arctan x)$
15. $f(x) = \cos^{-1}(e^{2x})$
16. $f(x) = (1 + x^2) \arctan(1 + x^2)$
17. $f(x) = \frac{\arcsin x}{\sqrt{1-x^2}}$
18. $y = x \arccos x - \sqrt{1-x^2}$
19. $y = \sin^2(\cos x)$
20. $y = \sqrt[5]{x \tan x}$
21. $x^2 \cos y + \sin 2y = xy$
22. $\sin(xy) = x^2 - y$
23. $f(x) = (x - \frac{1}{x^2})^{\sqrt{7}}$
24. $xy^4 + x^2y = x + 3y$
25. $f(x) = \sec(1 + x^2)$
26. $y = (1 + \cos^2 x)^6$
27. $y = \sin(\tan \sqrt{\sin x})$
28. $f(x) = \tan^3(3x)$
29. $f(x) = \arctan(\ln(x^2 + 2))$
30. $f(x) = (2x - 5)^4(8x^2 - 5)^{-3}$
31. $f(x) = \sqrt[3]{\sin^2(4x + 1)}$
32. $g(t) = (\frac{t^2}{t+1})^{-6}$

33. $y = \frac{\sqrt{x+1}}{\sqrt{x-1}}$
 34. $h(u) = (u^{-2} + u^{-3})(u^5 - 2u^2)^4$
 35. $\tan\left(\frac{x}{y}\right) = x + y$
 36. $\sqrt{x+y} = 1 + x^2y^2$
 37. $y \sin(x^2) = x \sin(y^2)$
 38. $e^xy = x + y$
 39. $xe^y + ye^x = 1$
 40. $e^{x^2y} = x + y$
 41. $y = \frac{x^2+4x+3}{\sqrt{x}}$
 42. $v = t^2 - \frac{1}{\sqrt[4]{t^3}}$
 43. $R(x) = \frac{\sqrt{10}}{x^7}$

Find the **second derivative**. In the case of implicit differentiation you must isolate the second derivative y'' and your final answer should only contain x 's and y 's.

44. $y = \frac{\ln x}{x^2}$
 45. $y = x \ln x$
 46. $f(t) = \sqrt{4t+1}$
 47. $x^6 + y^6 = 1$
 48. $y = (1 + 2x)^{10}$
 49. $y = \sin x + \sin^2(x)$
 50. $y = (x^3 + 1)^{\frac{2}{3}}$
 51. $H(t) = \tan(3t)$
 52. $\sqrt{x} + \sqrt{y} = 1$