

*Sample!* YOUR TEST WILL HAVE 6 PROBLEMS IN 15 MINUTES. *Sample!*

Math 151:4,5,6

10/26/2006

Name \_\_\_\_\_ Section \_\_\_\_\_

## Second Computational Test (Derivatives)

NO CALCULATORS OR NOTES ARE ALLOWED.

Find  $\frac{dy}{dx}$  in each case. Please do **not** simplify your answers in any way. For example, the derivative of  $37x^{46}$  may be written as  $(46)37x^{45}$ . SHOW DETAILS in the space next to each problem, but you may write your answer directly in the space for the answer if it follows directly from the differentiation algorithms.

HERE ARE EXAMPLES OF ACCEPTABLE ANSWERS. OTHER ANSWERS MAY ALSO EARN FULL CREDIT. PLEASE USE MANY LEFT & RIGHT PARENTHESES WHEN DIFFERENTIATING.

1.  $y = (\cos 2x)e^{5x}$

Answer to 1  $\underline{(-\sin(2x)2) e^{5x} + (\cos 2x) ((e^{5x}) 5)}$

2.  $y = \frac{x^2 + 5x - 1}{-7x^3 + 2}$

Answer to 2  $\underline{\frac{(2x + 5) (-7x^3 + 2) - (x^2 + 5x - 1) (-7(3x^2))}{(-7x^3 + 2)^2}}$

3.  $y = 5 \ln(7 - 2x) + 6\sqrt{9x - 4} - \frac{2}{x^7}$

Answer to 3  $\underline{5\left(\frac{1}{7-2x}\right)(-2) + 6\left(\frac{1}{2}\right)(9x-4)^{-1/2}9 - 2(-7)x^{-8}}$

4. Find  $\frac{dy}{dx}$  if  $4y^2 - 7y^5 = 2x^3 + 2$ . Express the answer in terms of  $x$  and  $y$ .

$\frac{d}{dx}$  the equation. The result is:  $4(2y)\frac{dy}{dx} - 7(5y^4)\frac{dy}{dx} = 2(3x^2)$ . Then

$(4(2y) - 7(5y^4))\frac{dy}{dx} = 2(3x^2)$ .

Answer to 4  $\underline{\frac{dy}{dx} = \frac{2(3x^2)}{4(2y) - 7(5y^4)}}$

**OVER**

$$5. y = (\cos(x^3) - 9 \sin(5x))^4$$

$$\text{Answer to 5 } \underline{4(\cos(x^3) - 9 \sin(5x))^3 (-\sin(x^3)3x^2 - 9 \cos(5x)5)}$$

$$6. y = e^{5 \arctan x} + 2 \arcsin(5x)$$

$$\text{Answer to 6 } \underline{(e^{5 \arctan x}) 5 \left( \frac{1}{1+x^2} \right) + 2 \left( \frac{1}{\sqrt{1-(5x)^2}} \right) 5}$$

$$7. y = \frac{7^x - 3^x}{x^5 + x^8}$$

$$\text{Answer to 7 } \underline{\frac{(7^x \ln 7 - 3^x \ln 3)(x^5 + x^8) - (7^x - 3^x)(5x^4 + 8x^7)}{(x^5 + x^8)^2}}$$

8. Find  $\frac{dy}{dx}$  if  $5x^3y^2 - 7ye^{2x} + 19 = 0$ . Express the answer in terms of  $x$  and  $y$ .

$\frac{d}{dx}$  the equation. The result is:  $5(3x^2y^2) + 5x^3 \left( 2y \frac{dy}{dx} \right) - 7 \frac{dy}{dx} e^{2x} - 7ye^{2x} 2 = 0$ .

Then  $5(3x^2(2y) - 7e^{2x}) \frac{dy}{dx} = -5(3x^2y^2) + 7ye^{2x} 2$ .

$$\text{Answer to 8 } \underline{\frac{dy}{dx} = \frac{-5(3x^2y^2) + 7ye^{2x} 2}{5x^3(2y) - 7e^{2x}}}$$