Math 151:4,5,6 **Second Computational Test (Derivatives)** 10/27/2006

Name _____ **Section** _____

NO CALCULATORS OR NOTES ARE ALLOWED.

Find $\frac{dy}{dx}$ in each case. Please do **not** simplify your answers. 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.

1. $y = \dfrac{2x^7 - 7x^3}{5\sin(3x)}$

Solution $\dfrac{\left(2(7x^6) - 7(3x^2)\right)\left(5\sin(3x)\right) - \left(2x^7 - 7x^3\right)\left(5\left(\cos(3x)\right)\right)(3)}{\left(5\sin(3x)\right)^2}$.

2. $y = x^3\sqrt{5 - 3x^6}$

Solution $3x^2\sqrt{5 - 3x^6} + \frac{1}{2}\left(5 - 3x^6\right)^{-1/2}\left((-3)6x^5\right)$

3. $y = 17^{4x} + \ln\left(x^3 - 7x^2 + 44\right)$

Solution $17^{4x}\ln(17)4 + \left(\frac{1}{x^3 - 7x^2 + 44}\right)\left(3x^2 - 7(2x)\right)$

4. $y = x^3\arctan(2 - x)$

Solution $3x^2\arctan(2 - x) + x^3\left(\frac{1}{1 + (2-x)^2}\right)(-1)$.

5. $y = \cos(x^2)e^{7x}$

Solution $-\sin(x^2)(2x)e^{7x} + \cos(x^2)e^{7x}7$

6. Find $\frac{dy}{dx}$ if $x^2y - 4x^3y^6 = 7y + 3$. Express the answer in terms of x and y.

$\frac{d}{dx}$ the equation. The result is: $2xy + x^2\frac{dy}{dx} - 4(3x^2)y^6 - 4x^3(6y^5)\frac{dy}{dx} = 7\frac{dy}{dx}$ so that $2xy - 4(3x^2)y^6 + \left(x^2 - 4x^3(6y^5) - 7\right)\frac{dy}{dx} = 0$ and

$\frac{dy}{dx} = -\left(\frac{2xy - 4(3x^2)y^6}{x^2 - 4x^3(6y^5) - 7}\right)$

Answer to 6 _____