Name Key

Take-Home Quiz #5

Due Monday October 26th at the beginning of class

MATH 105 – Amber Buntin - Fall 2015

SHOW ALL WORK and be sure to use appropriate notation. If you do not show work, you will not receive full credit. Please make sure you DO NOT consult with other students on this quiz. This quiz should contain ONLY your work. If I see the same incorrect answers or similar work on two quizzes, I will assume there has been cheating and BOTH parties will receive a score of ZERO.

1. (2 points) Given $y = \dfrac{x^2+5x-2}{3x+4}$ compute y' and simplify completely.

$$y' = \frac{(3x+4)(2x+5) - (x^2+5x-2)(3)}{(3x+4)^2}$$

dropped (then errors ±.5

$$y' = \frac{6x^2 + 15x + 8x + 20 - 3x^2 - 15x + 6}{(3x+4)^2}$$

$$\boxed{y' = \frac{3x^2+8x+26}{(3x+4)^2}}$$

±1/2 effort but incorrect

2. (2 points) Given $y = u^2 + 5u$ and $u = 2x - 7$

Use the chain rule to **compute the derivative** and simplify completely.

$y = u^2 + 5u$

$\dfrac{dy}{du} = 2u + 5$

$u = 2x - 7$

$\dfrac{du}{dx} = 2$

$$\frac{dy}{dx} = \frac{dy}{du}\cdot\frac{du}{dx}$$

$$= (2u+5)(2)$$

$$= 4u + 10 \quad \text{but } u = 2x-7$$

$$= 4(2x-7) + 10$$

$$= 8x - 28 + 10$$

$$\boxed{\frac{dy}{dx} = 8x - 18}$$

4

+1.5/3 effort but error +1 big error or incomplete

3. (3 points) Compute the **equation** of the tangent line to the curve at $x=1$ and answer in **slope intercept form.**

$y=\left(2x^2-5x+1\right)^3$

$y' = 3(2x^2-5x+1)^2(4x-5)$

$y' = 3(4x-5)(2x^2-5x+1)^2$

$m_{tan} = y'|_{x=1} = 3(4(1)-5)(2(1)^2-5(1)+1)^2$

$= 3(4-5)(2-5+1)^2$

$= 3(-1)(-2)^2$

$= -3(4)$

$m_{tan} = -12$

$y|_{x=1} = (2(1)^2-5(1)+1)^3$

$= (2-5+1)^3$

$= (-2)^3$

$= -8$

$m = -12 \quad (1,-8)$

$y-(-8) = -12(x-1)$

$y+8 = -12x+12$

$y = -12x+12-8$

$\boxed{y = -12x+4}$

4. (3 points) Use implicit differentiation to compute the derivative of the implicit equations. Reduce completely if necessary.

a. $5y^3 = 7+3x^6$

1

$15y^2 \cdot y' = 0 + 18x^5$

$y' = \dfrac{18x^5}{15y^2}$

$\boxed{y' = \dfrac{6x^5}{5y^2}}$

b. $-2x+xy = 4y^3$

product rule!

2

$-2 + (x \cdot 1y' + y \cdot 1) = 12y^2 \cdot y'$

$-2 + xy' + y = 12y^2y'$

$xy' - 12y^2y' = 2 - y$

$y'(x-12y^2) = 2-y$

$\boxed{y' = \dfrac{2-y}{x-12y^2}}$

OR $\dfrac{-2+y}{12y^2-x}$ OR $\dfrac{y-2}{12y^2-x}$

/6