Math 1400 Fall 2011
Quiz 8
November 2, 2011
No Work = No Credit

Name: _____ **Student Number:** _____

1. (3 points) Differentiate $f(x) = (5x-2)e^{1-2x}$.

Solution:

$$f'(x) = \frac{d}{dx}[(5x-2)e^{1-2x}]$$

$$f'(x) = (5x-2)\frac{d}{dx}[e^{1-2x}] + e^{1-2x}\frac{d}{dx}[(5x-2)]$$

(Above step by the product rule)

$$f'(x) = (5x-2)e^{1-2x}(-2) + e^{1-2x}\frac{d}{dx}[(5x-2)]$$

(Above step by taking $g(x) = 1-2x$ in the rule that: $\frac{d}{dx}[e^{g(x)}] = e^{g(x)}g'(x)$)

$$f'(x) = (5x-2)e^{1-2x}(-2) + e^{1-2x}(5)]$$

(Above step by the fact that the derivative of a linear function is its slope)

2. (2 points) Differentiate $y = \ln(x+3) + \ln 5$.

Solution:

$$\frac{dy}{dx} = \frac{d}{dx}[\ln(x+3) + \ln 5]$$

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$$\frac{dy}{dx} = \frac{d}{dx}[\ln(x+3)] + \frac{d}{dx}[\ln 5]$$

(Above step by sum rule)

$$\frac{dy}{dx} = \frac{1}{x+3}(1) + \frac{d}{dx}[\ln 5]$$

(Above step by taking $g(x) = x + 3$ in the rule that: $\frac{d}{dx}[\ln(g(x))] = \frac{1}{g(x)}g'(x)$)

$$\frac{dy}{dx} = \frac{1}{x+3}(1) + 0$$

Above step follows in either of two ways:

1. Notice that $\ln(5)$ is a constant real number, so its derivative is 0.
2. Take $g(x) = 5$ in the rule that: $\frac{d}{dx}[\ln(g(x))] = \frac{1}{g(x)}g'(x)$. Then the derivative is: $\frac{1}{5} * 0 = 0$.

$$\frac{dy}{dx} = \frac{1}{x+3}$$

...show all work...show all work...show all work...show all work...show all work...show all work...