Midterm 3 – Math 203

Friday, November 16, 2018

You may use standard 8.5in by 11in double sided cheat sheet.
You may use a simple (non-graphing) calculator.
Justify your answers to obtain full credit (and partial credit, too).
All answers must be simplified unless otherwise stated.
You have 50 minutes.
This exam consists of 5 questions.
Please verify that you have all pages.

Name:_____ **ID#:**_____

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1. (*20 points*) Evaluate the following integrals. **(Don't forget $+C$ when necessary!)**

(a) $\displaystyle\int (e^{5x} + x^{1/2})\, dx$

(b) $\displaystyle\int_1^e \left(5x^4 - \frac{1}{x}\right) dx$ (Recall: $\ln(e) = 1$ and $\ln 1 = 0$.)

(c) $\displaystyle\int_1^9 \frac{1}{\sqrt{x}}\, dx$

(d) $\displaystyle\int \left(5x^2 + 3x^2 + \frac{1}{x^5}\right) dx$

2. (*25 points*) Differentiate the following functions. **You do not have to simplify your answer.**

(a) $\ln(1+x^2)$

(b) $x^2 e^x$

(c) e^{x^3+1}

(d) $\ln(\ln x)$

(e) $\dfrac{e^x}{\ln x}$

3. (*20 points*) Use logarithmic differentiation to find the derivative of $y = \dfrac{(x+1)^3(4x^2+5)^2}{(2x+4)^7}$. You do not need to simplify your answer.

4. (*20 points*) Set up **but do not evaluate** the integral(s) needed to find the area between the curves $y = 2x^2$ and $y = 6x$ from $x = -2$ to $x = 3$.

5. (*15 points*)

Note: No simplification or calculations are required for the following problems.

(a) The demand equation for a certain product is given by $p = -0.8x + 150$. Write down **but do not evaluate** the integral needed to compute the consumer surplus for $x = 10$.

(b) Suppose the marginal profit for a company is given by $P(x) = -10x + 900\sqrt{x} - 10,000$. Write down **but do not evaluate** the integral needed to find the net change in profit from $x = 25$ to $x = 100$.

(c) You deposit money steadily into a savings account at the rate of \$1000 per year. Write down **but do not evaluate** the integral needed to find the future account balance in 5 years if the account pays 8% interest compounded continuously.

Final Score

	Score	Out of
Question 1		20
Question 2		25
Question 3		20
Question 4		20
Question 5		15
Total		100