Homework: http://math.mnrt.net/

Name _____ raw _____ scaled _____ percent _____

Calculus Trimester 2 Exam 2 (165 Points)

Integration

Do NOT turn this page until you have read these instructions.

- **Before you turn this page, you are welcome - encouraged - to use all resources to learn the material fully.**
- **After you turn this page, your work must be your own, you may not consult with another person, and you cannot use any resources other than your own brain; e.g. no books, no notes, no internet. Do not turn this page until you are sure you are ready to do your best. There is no time limit.**
- **Answers must be exact and fully simplified. You may use a calculator.**
- **Partial credit may be given for correct work, even when the answer is incorrect. Therefore, it is to your advantage to write clear solutions. If I cannot understand a solution within 120 seconds, then it will receive very little or no partial credit.**
- **You are to write a final draft of your exam that you hand in.**
- **Your exam must be delivered to me no later than 3:30 PM on Friday, March 2, 2007. If you cannot find me, then place it on my chair in my office.**

■ **A. Evaluate the following. (33 points each)**

[1] $\int_0^{13} \frac{1}{\sqrt[3]{(1+2x)^2}}\,dx$

[2] $\int_2^3 \frac{3x^2-1}{(x^3-x)^2}\,dx$

[3] $\int_{-\frac{\pi}{2}}^{\frac{\pi}{2}} \cos\theta \cos(\pi \sin\theta)\,d\theta$

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■ **B. Compute the area of the following regions. (12 points each)**

[1] Between $y = x + 2$ and $y = x^2$

[2] Between $y = x - 1$ and $x = 3 - y^2$

OVER ⟶ OVER ⟶ OVER ⟶ OVER ⟶

■ **C. (17 points each)**

[1] Suppose that $F(x) = \int_1^{2x} \cos(t^2)\, dt$. Find the derivative $F'(x)$.

[2] Suppose a car is moving with a velocity $v(t) = 3t\sqrt{t^2+9}$ ms^{-1} away from you. If the car is 20 meters away from you at time $t = 0$, how far away is it at time $t = 4$ seconds?

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■ **D. (8 points each)**

[1] Use Riemann sums with four intervals of length one to find positive numbers m and M with

$$0 < m \leq \int_1^5 \left(3 + \frac{1}{x}\right) dx \leq M$$

END END END END