

MATH 140A.2/4
Quiz#9
11-21-2003

Name:
SSN:

Total = 30 points. Show all your work!

Find the following indefinite integrals, check the correctness of your answer by differentiation.

1. $\int (4x + 1)^2 dx$

2. $\int (9x^{4/5} + 5x^{1/3} + \pi) dx$

3. $\int \tan^2(2x) dx$

4. $\int \cos^2(4\theta) d\theta$

5. Suppose $y'' = 6 - \cos(x)$, $y(0) = 4$ and $y'(0) = 2$, find y .

(continue)

6. What is the area of the largest rectangle which can be inscribed in the ellipse $x^2/9 + y^2/16 = 1$? (Hint: The problem is easier to solve by substituting $x = 3\cos(\theta)$ and $y = 4\sin(\theta)$, and find the optimal angle θ that would maximize the area.)

7. After more evil-doings, Mojo Jojo is fleeing east away from (the ruin of) Townsville at 5 miles per minute. Heading north at a speed of 15 miles per minute toward Townsville are the trio of kindergartener-superheroes: Blossom, Bubbles, and Buttercup. How fast is the distance between Mojo Jojo and the Powerpuff Girls changing at the moment when Mojo is 12 miles away and PPGs are 5 miles from Townsville?