

Math 1210-1    Test 3

Name: \_\_\_\_\_

ST# \_\_\_\_\_

Show all your work in a neat and organized manner. Write your answers and solutions in the space provided. Please box your answers. You may NOT use a calculator.

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1. (4 pts) Solve:

$$\int 4 \cos \theta \, d\theta$$

2. (8 pts) Solve the following differential equation. Give the general solution and the solution satisfying that when  $x = 0$ ,  $y = 2$ .

$$\frac{dy}{dx} = \frac{3x - 7x^2}{y^2}$$

3. (3 pts) Write the following in sigma notation:

$$1 + \frac{1}{2} + \frac{1}{3} + \frac{1}{4} + \dots + \frac{1}{50}$$

4. Find the following values: (you may leave the answer to (a) unsimplified)

(a) (6 pts)  $\sum_{i=1}^{100} (2i^2 - 9i + 4)$

(b) (4 pts)  $\sum_{j=1}^n \left( \frac{1}{a_j} - \frac{1}{a_{j+1}} \right)$

5. (6 pts) Write the specific formula needed to estimate the area under the graph of  $y = x^2 + 4$  between  $x = 0$  and  $x = 3$  with  $n$  subintervals and using the right hand endpoints of the subintervals. **DO NOT SIMPLIFY OR SOLVE!!**

6. (4 pts) What is the Mean Value Theorem for Integrals? You may use a picture, but be sure to explain what the picture represents.

7. (4 pts) Find the derivative of  $G(x)$  if  $G(x) = \int_{x^5}^5 t^2 + \cos t \, dt$ .

8. (7 pts) Evaluate:

$$\int_0^{\pi/4} \frac{\sin t}{\cos^4 t} \, dt$$

9. (4 pts) If the velocity of a particle traveling along a coordinate axis is given by  $v(t) = 3t + 13$ , what is the displacement of the particle from  $t = 2$  to  $t = 9$  seconds?