

Math 108H Exam 3

Name _____.

Show all work, no calculator

1. (18 points) Evaluate each of the following integrals:

a. $\int x e^{3x} dx$

b. $\int \cos^5 x \sin^6 x dx$

c. $\int \frac{3}{2x^2+8x+26} dx$

2. (13 points) Find an integral (don't evaluate) that will give you the volume of the solid of revolution obtained by revolving the region in the first quadrant bounded by the parabola $y = x^2$, the y -axis and the line $y = 1$ about the line $x = 2$.

3. (13 points) Evaluate the integral $\int \frac{x^2}{\sqrt{9-x^2}} dx$.

4. (14 points) Find the area of the region bounded by the curves $x = y^2$ and $x = y + 2$.

5. (14 points) Evaluate the integral $\int \frac{4x^2+x+25}{(x-1)(x^2+9)} dx$

6. (14 points) A rectangular tank is 4 foot by 4 foot on the bottom and is 3 feet high. If the depth of the water in the tank is 2 feet, find the total force on the bottom of the tank and the total force on one side of the tank.

7. (14 points) A rope hangs from the top of a building with height 100 feet to the ground and a 4 pound weight is attached to the end of the rope. How much work is done pulling the rope and the attached weight to the top of the building if the rope weighs 20 pounds?