

Math 181
Spring, 2008

Name _____

Exam 1

Part 1

No Calculator! No Notes!

REMEMBER: PART 2 HAS 6 QUESTIONS – LEAVE YOURSELF ENOUGH TIME!

1. Evaluate each of the integrals.

a) $\int x^3 \sin(3x) dx$

b) $\int \frac{x^2}{x-1} dx$

c) $\int \frac{dx}{x \cos(\ln x)}$

d) $\int \frac{1-z}{\sqrt{1-z^2}} dz$

e) $\int \arccos x dx$

$$f) \int \frac{6x+7}{(x+2)^2} dx$$

g) $\int \frac{x+4}{x^3+3x^2-10x} dx$

h) $\int \sin(\ln x) dx$

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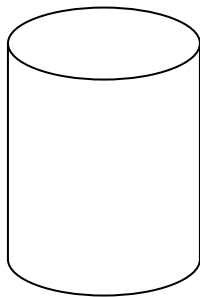
Name _____

Exam 1
Part 2
Calculator OK!
No Work = No Credit!

1. Find the volume of the solid obtained by rotating the region enclosed by the graphs of $f(x) = 9 - x^2$ and $g(x) = 9 - 3x$ about the y-axis. **6 points**

2. Find the area of the surface obtained by rotating $y = \sqrt{x} - \frac{1}{3}x^{\frac{3}{2}}$ about the x-axis for $1 \leq x \leq 3$. **6 points**

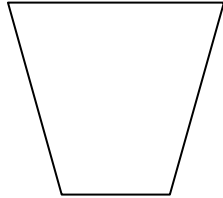
3. A cylindrical water tank 12 feet high with a radius of 8 feet is buried so that the top of the tank is 3 feet below ground level. How much work is done in pumping a tank that is half full of water up to ground level? Water weighs 62.5 pounds per cubic foot. **6 points**



4. A force of 30 N is required to maintain a spring stretch from its natural length of 12 cm to a length of 15 cm. How much work is done in stretching the spring from 12 cm to 20 cm? **6 points**

5. A vertical gate in a dam has the shape of an isosceles trapezoid 10 feet across the top and 8 feet across the bottom, with a height of 4 feet. What is the fluid force on the gate when the top of the gate is 6 feet below the surface of the water? The weight-density of water is 62.5 pounds per cubic foot. **6 points**

5.



6. Find the volume of the solid generated by revolving the region bounded by

$$y = \frac{1}{x^4 + 1}$$

$$y = 0$$

$$x = 0$$

$$x = 1$$

about the y-axis. **6 points**