NAME:

MATH 133 - Michigan State University
October 10th, 2017.

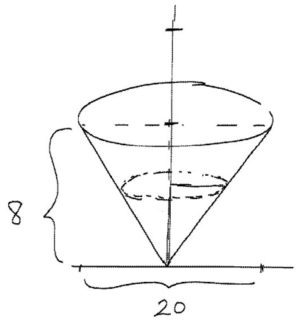
Quiz 6

Clear your desk of everything except pens, pencils and erasers. **Show all your work.**
If you have a question raise your hand and I will come to you.

Special Instructions: This longer quiz will be 30 minutes. In the remaining 20 minutes of recitation, GRADE YOUR OWN QUIZ based on the solutions (which will be put up on the projector). **USE a DIFFERENT COLORED pen/pencil to grade your quiz!** Also CORRECT any mistakes in your quiz while grading (using the different colored pen/pencil).

Problem	Possible Score	Earned Score
1	10	
2	10	
3	8	
4	10	
5	10	
6	12	
Total	60	

1. [10 points] A storage tank is shaped like an inverted cone (point down), 20 ft across the top and 8 ft tall. The tank is full of a liquid weighing 80 lbs/ft^3. How much work does it take to empty the tank by pumping its contents to a level 6 ft above the top? *(Set up the integral correctly and integrate but don't compute the numerical final value, no one cares.)*



2. [10 points] Consider the region R in the x, y-plane bounded by the curves $y = x^2$ and $y = 4$.

a). [4 points] Sketch the region in the plane (label any important people on the x and y axes.)

b). [3 points] Set up the integral to compute the volume of the solid obtained by rotating the region R about the line $y = 4$. (Don't evaluate).

c). [3 points] Set up the integral to compute the volume of the solid obtained by rotating the region R about the line $y = 6$. (Don't evaluate).

3. [8 points] Find the derivatives of

a). [4 pts.] $f(x) = x^{\sin(3x)}$.

b). [2 pts.] $f(x) = \log_3(\tan(5x))$.

c). [2 pts.] $f(x) = e^{\ln(\cos(x))}$.

4. [10 points] Find

$$\int_{-\infty}^{0} xe^x \, dx.$$

5. [10 points] Find

$$\int \sin^5 x \cos^2 x \, dx.$$

6. [12 points] Find each of the integrals:

1. $\int \frac{1}{x+2}\,dx.$

2. $\int \frac{x}{x+2}\,dx.$

3. $\int \frac{x^2}{x+2}\,dx.$

4. $\int \frac{1}{x^2+2}\,dx.$

5. $\int \frac{x}{x^2+2}\,dx.$

6. $\int \frac{x^2}{x^2+2}\,dx.$