MATH 129-006:
TEST 3- MAKE UP

FALL 2015

Name	
I.D. Number	

Question	Points	Score
1	10	
2	10	
3	10	
4	10	
Total	40	

(1) A water tank in the shape of a cone with height 40 ft and base radius 8 ft. The cone rests on its base. Recall that 1 cubic foot of water weighs 62.4 pounds. For the problems below, you do not need to calculate the integrals. To receive any partial credit, you must show the work on the Riemann sum you use to determine the integral.

a) If the tank is full, find an integral which calculates the work required to pump the water to the top (the height of the tip) of the tank.

b) If the tank is half-full, find an integral which calculates the work required to pump the water 5 ft above the top of the tank.

(2) a) Write the following as a finite geometric sum and find its value.

$$\frac{3}{4}+\frac{3}{8}+\frac{3}{16}+\frac{3}{32}+\cdots+\frac{3}{2^{14}}$$

b) Calculate

$$\sum_{n=5}^{\infty}\frac{(-2)^n+(2e)^n}{\pi^{2n}}$$

(3) Determine whether the following series converge or diverge. Write a sentence describing the convergence test you used and state your conclusion. For full/partial credit, show all work necessary to reach your conclusions.

a)

$$\sum_{n=3}^{\infty} \frac{5n^2+4}{7n^5+2n^3}$$

b)

$$\sum_{n=1}^{\infty} \frac{(-1)^n}{\sqrt{n^2+3}}$$

(4) Consider the following power series.

$$\sum_{n=0}^{\infty} \frac{(-1)^n n^2}{3^{2n}} (x+2)^n$$

a) Find the radius of convergence.

b) Find the interval of convergence. You do not need to consider the endpoints.