

Math 180
Spring 2010

Name _____

Homework #9

Due Tuesday, April 13

No late homework accepted! No excuses!

1. Gravel is being dumped from a conveyor belt at a rate of 30 cubic feet per min and its coarseness is such that it forms a pile in the shape of a cone whose base diameter and height are always equal. How fast is the height of the pile increasing when the pile is 10 feet high?

$$V = \frac{1}{3} \pi r^2 h$$

2. The radius of a sphere was measured and found to be 21 cm with a possible error in measurement of at most 0.05 cm. What is the maximum error in using this value of the radius to compute the volume of the sphere?

3. Find the linear approximation of the function $f(x) = \sqrt{1-x}$ at $a = 0$ and use it to approximate $\sqrt{0.9}$.

4. Use differentials to approximate $(1.002)^5$.

5. A balloon is rising at a constant speed of 5 feet per second. A boy is cycling along a straight road at a speed of 15 feet per second. When he passes under the balloon, it is 45 feet above him. How fast is the distance between the boy and balloon increasing 3 seconds later?

6. Find the absolute maximum and minimum values of f on the given interval.

$$f(x) = x^4 - 2x^2 + 3 \quad [-2, 3]$$