

Math 180  
Winter, 2009

Name \_\_\_\_\_

Homework #16  
Due Tuesday, February 3  
No late papers accepted! No excuses!

1. Let  $f(x) = x^4 - x^3$ . Show that the equation  $f(x) = 75$  has a solution in the interval  $[3, 4]$  and use Newton's method to find it.

2. Solve the initial value problem.

$$\begin{aligned}\frac{d^3 r}{dt^3} &= -\cos t \\ r''(0) &= r'(0) = 0 \\ r(0) &= -1\end{aligned}$$

3. An isosceles triangle has its vertex at the origin and its base parallel to the x-axis with the vertices above the axis on the curve  $y = 27 - x^2$ . Find the largest area the triangle can have.

4. Evaluate the integrals.

a)  $\int_{\pi/6}^{5\pi/6} \csc^2 x dx$

b)  $\int_2^4 x^{\pi-1} dx$

c)  $\int_9^4 \frac{1-\sqrt{x}}{\sqrt{x}} dx$

5. Use the Fundamental Theorem of Calculus Part 2 to find the derivative of

$$y = \int_0^{\arcsin x} \cos t dt$$

6. Evaluate each of the indefinite integrals.

a)  $\int \cos x e^{\sin x} dx$

b)  $\int \frac{\sqrt{\arctan x}}{1+x^2} dx$

c)  $\int \sqrt{\frac{x-1}{x^5}} dx$