MATH 220: CALCULUS I
WORKSHEET 24
APRIL 18, 2013

1. Suppose that a polynomial g satisfies the following conditions.
   - $g(2) = 5$
   - $g'(2) = 3$
   - $g''(2) = 4$
   - $g'''(2) = 1$

   Use a linear approximation to estimate the value of $g(1.9)$. Simplify and write your answer in decimal form.

2. The graphs of $y = 5 - x^3$ and $y = x^2$ intersect somewhere on the interval $[1, 2]$. Estimate the x-value for this point of intersection by applying Newton's Method to an appropriate function with an initial estimate of $x_1 = 1$. Write the answer as a decimal or simplified fraction.

3. Approximate $\sqrt{26.3}$ using a linear function; write the answer in decimal form.

4. Find $\int \sin^5(x)\,dx$.

5. Let $\mathbf{R}$ be the finite region bounded by the graphs of $x = y^2$ and $x = 3y$. Compute the volume of the solid obtained when $\mathbf{R}$ is revolved around the specified line. You should solve each problem two ways – once by integrating with respect to x and once by integrating with respect to y.

   (a) Revolve $\mathbf{R}$ around $x = 0$ (the y-axis).
   (b) Revolve $\mathbf{R}$ around $x = -2$.
   (c) Revolve $\mathbf{R}$ around $x = 10$.
   (d) Revolve $\mathbf{R}$ around $y = 0$ (the x-axis).
   (e) Revolve $\mathbf{R}$ around $y = -1$.
   (f) Revolve $\mathbf{R}$ around $y = 5$.