Math 125 H - Winter 2010
Mid-Term Exam Number One
January 29, 2010
Answers

1. (a) $\dfrac{1}{2\sqrt{3}} \tan^{-1}\left(\dfrac{\sqrt{3}}{2}x\right) + C$

   (b) $\dfrac{1}{70}(x^5+1)^{14} - \dfrac{1}{65}(x^5+1)^1 3 + C$

2. (a) $2\pi + 4$ (b) $\dfrac{1}{2}e^4 - \dfrac{1}{2}e^2 - 1$

3. There are many ways to answer this problem. If you cut the interval $[0,1]$ into three equal subintervals, and bound the area under the curve on each subinterval and sum the bounds, you get

   $$1.225714 < \int_0^1 e^{x^2}\,dx < 1.79847$$

   and since $1.79847 - 1.225714 < \frac{2}{3}$, we're done.

4. $c = \left(\dfrac{9}{4}\right)^{2/3}$

5. The volume is $\frac{\pi}{6}$.

6. The volume is $\frac{224}{3}\pi$.