

Homework 5 - Math 1451-008 (Howle)
Due Friday 4/20/2012 in class

Name:

R Number:

This cover sheet must be attached as the top page of your homework.
See homework requirements in the syllabus.

1. A Norman window has the shape of a semicircle atop a rectangle so that the diameter of the semicircle is equal to the width of the rectangle. What is the area of the largest possible Norman window with a perimeter of 50 feet?
2. A ball is thrown directly upward from ground level with an initial velocity $v(0) = 96 \text{ ft/s}$. Assuming that the ball's only acceleration is that due to gravity, i.e, $a(t) = -32 \text{ ft/s}^2$, determine the maximum height reached by the ball and determine the time it takes to return to ground level.
3. Given the following integral:

$$\int_1^3 4x^2 + 2 \, dx$$

- (a) Estimate the value of the integral using a Riemann sum $S_n = \sum_{k=1}^n f(a + k\Delta x)\Delta x$ with $n = 4$ and using right endpoints.
- (b) Evaluate the definite integral **using the definition**. Use equal width subintervals and evaluate the function at right endpoints. So in this case, you are evaluating

$$\lim_{n \rightarrow \infty} \sum_{k=1}^n f(a + k\Delta x) \Delta x,$$

where $\Delta x = \frac{b-a}{n}$.