

Math 125 Worksheet #1
June 28, 2007

1. $f(x) = \cos(x)$

(a) Estimate the area (to 4 decimal places) under the curve of f from $x = 0$ to $x = \frac{\pi}{2}$ using 3 approximating rectangles using midpoints as sample points.

(b) Approximate each of the following integrals given your approximation to part (a).

i. $\int_0^{\pi/2} \cos(x) dx$

iii. $\int_{\pi/2}^{3\pi/2} \cos(x) dx$

ii. $\int_{-\pi/2}^{\pi/2} \cos(x) dx$

iv. $\int_0^{\pi} \sin(x) dx$

2. Prove that for $b \geq a$, $\int_a^b x dx = \frac{1}{2}(b^2 - a^2)$ using the definition of area involving the limit of a sum. (You can verify this result graphically.).

3. Evaluate the following sums.

(a) $\sum_{j=2}^6 \tan(j\pi)$

(b) $\sum_{i=1}^n (3i - 2)$ for some integer n

4. Find the most general form of a function f such that $f''(x) = 2e^x - 12x$.