

Math 261 Spring 2008

Project #4: Applications of Integration

The due date for this assignment is may 28 2008 .

1. perform the integration by hand and then use a CAS to check your result.

a. $\int \frac{\cos 3x}{\sqrt{5 - \sin 3x}} dx$

b. $\int \frac{\sqrt{3 + \sqrt{x}}}{\sqrt{x}} dx$

2. Find a value for k that satisfies the following equations:

a. $\int_0^k (x^2 + \sin 2x) dx = 3 \quad (k > 0)$

b. $\int_1^4 \frac{x}{\sqrt{1 + kx^2}} dx = 2.5 \quad (k > 0)$

3. Find all values of k that satisfies the equation: $\int_1^k (x^2 + \sin 2x) dx = 3 \quad \& \quad k > 0$

4. Find a positive value for k such that the region enclosed by $y = \sqrt{x}$, $y = \frac{x}{2} + 1$, $x = 0$ & $x = k$ has an area of 2 square units.

5. Find the volume of the solid generated in the first quadrant enclosed by the x & y axis and the curve $y = 1 + x^2 - x^3$ is revolved about the x-axis.

6. Consider the region in the first quadrant enclosed by the x & y axis, the line $x = 2$ and the curve $y = \frac{2}{(1 + kx)^{\frac{3}{2}}}$ ($k > 0$). Find the value of k so that the solid generated by revolving the region about the x - axis has a volume of 4 cubic units.