# Assignment 5   MATH 1500

(Follows Unit 13 in the manual)

Values

[8]   1. Let x and y be two nonnegative numbers whose sum = 30. What is the largest possible value of $P = x^2 y$?   [cf. Section 4.7]

[10]   2. A farmer has 20 m of fencing material. He wishes to enclose a rectangular plot of land adjacent to his barn. No fence is needed on the side adjacent to the barn. Find the dimensions of the rectangle of largest area that can be enclosed with the 20 m of fencing material. [cf. Section 4.7]
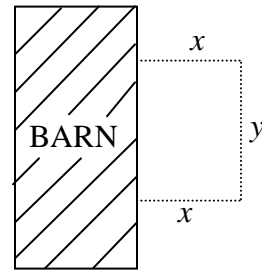
[8]   3. Find the point on the parabola $y = x^2$ that is closest to the point (18, 0).

[6]   4. Find the most general antiderivative $F(x)$ of the given function $f(x)$. [cf. Section 4.10]

   (a) $f(x) = 2x^3 + 4x^2 - 6$ (b) $f(x) = \dfrac{2}{x} - \sin x$

[8]   5. Find the antiderivative $F(x)$ of the function $f(x)$ that satisfies the given conditions.   [cf. Section 4.10]

   (a) $f(x) = 6x^2 + 4x + 3$ $F(1) = 8$ (b) $f(x) = 3e^x + 2\cos x$ $F(0) = 5$

[10]   6. Find the area of the region that lies under the graph of $f(x)$ = x between $x = 0$ and $x = 2$ by taking the limit of the sum of approximating rectangles whose heights are the values of the function at the right hand end point of each subinterval.   [cf. Section 5.1]
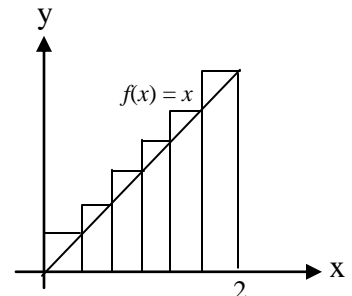
[10]   7. Evaluate each of the following definite integrals by interpreting it as an area. [cf. Section 5.2]

(a) $\int_0^4 (x+1)dx$ (b) $\int_{-2}^2 \sqrt{4-x^2}\,dx$

[10]   8. Use the Fundamental Theorem of Calculus to evaluate the following definite integrals.   [cf. Section 5.3]

(a) $\int_1^2 \left(3x^2 + 2x\right)dx$ (b) $\int_1^2 \left(\frac{x^3+1}{x}\right)dx$

Total = 70