MATH 1700 D01 Summer 2015 Assignment 1

SHOW ALL WORK to get full marks. Leave answers as exact answers. For example, leave it as e^2 as opposed to a decimal approximation.

1. Use 4 subintervals, and right endpoints, to approximate the area under the curve $y = 2x^2 - 2$ from $x = 1$ to $x = 2$.

2. Use the Riemann sum find the area under the curve of $y = x^3 - 3x + 4$ from $x = 1$ to $x = 3$.

3. Use the definition of the definite integral to find

$$\int_{-1}^{3} (x^2 - 5x - 2)\, dx$$

4. Use the Fundamental Theorem of Calculus to find

   (a)
   $$\int_{-1}^{3} (x^2 - 5x - 2)\, dx$$

   (b)
   $$\int_{1}^{2} \left(e^t + 2^t - \frac{1}{t^3} + \frac{5}{t} \right) dt$$

   (c)
   $$\int_{1}^{2} \frac{(y+2)^2}{y}\, dy$$

   (d)
   $$\int_{-1}^{2} \frac{y^2 + 2}{y}\, dy$$

5. Find the following derivatives

   (a)
   $$\frac{d}{dx} \int_{-4}^{x} \left(\frac{\sin t}{t^3 + 1} \right) dt$$

   (b)
   $$\frac{d}{dx} \int_{3}^{x^3 + x} \left(\frac{u \sin u}{u^2 + 3} \right) du$$

   (c)
   $$\frac{d}{dy} \int_{\sqrt{y}}^{\sec y} \left(\frac{u}{u^2 + u + 1} \right) du$$