

MATH 1700 D01 Summer 2016 Assignment 2

SHOW ALL WORK to get full marks. Leave answers as a fraction. For example, leave it as fractions such as $1/7$ as opposed to decimals such as 0.142857. Word problems should have sentence answers with units. Fractions should be lowest terms.

All assignments must be handed in on UMLearn as **one PDF file**. Late assignments will not be accepted. Failure to follow the instructions will result in a mark of 0.

1. Evaluate the following indefinite integrals

$$[4] \quad (a) \int \left(\frac{y^4 - 6y^2 + 7\sqrt[3]{y}}{y^3} \right) dy$$

$$[4] \quad (b) \int (5 - 3t)^{2016} dt$$

$$[4] \quad (c) \int \sec u \tan u \cos(\sec u) du$$

2. Evaluate the following definite integrals

$$[5] \quad (a) \int_0^{\ln 2} \frac{e^{3x}}{(e^{3x} + 1)^2} dx$$

$$[5] \quad (b) \int_0^{1/2} \frac{\cos^{-1} x}{\sqrt{1 - x^2}} dx$$

$$[5] \quad (c) \int_e^{e^8} \frac{1}{t\sqrt[3]{\ln t}} dt$$

$$[3] \quad (d) \int_{-3}^3 \frac{(u^3 + u) \cos u}{u^6 + 1} du$$

[5] 3. Evaluate the following integral by interpreting it in terms of areas

$$\int_{-4}^4 (3 + \sqrt{16 - x^2}) dx$$

(The question did not say using the definition of area)

[8] 4. Draw a sketch of the region R and then calculate the area of R where R is the region bounded by the curves $y = x^2$, $y = 6 - x$ and $y = 6 - 5x$ where $x \geq 0$.

[12] 5. Draw a sketch of the region R and then calculate the volume of revolution of R where R is the region bounded by $y = 5x - x^2$, $y = 2 + x$ rotated about

(a) $y = 3$

(b) $x = 3$.

- [5] 6. A cup of coffee has temperature 42° and takes an hour to cool to approximately 28.72° in a room of temperature 23° . It can be shown that the temperature follows the function

$$T(t) = 23 + 19e^{-kt}$$

where $k = 0.02$ and t is in minutes. Calculate the average temperature of the coffee over the first hour. (Decimal answers are fine, here, but no approximations of the exponential.)

This assignment is out of 60 points.