



Department of Mathematics and Natural Sciences

MAT 120

ASSIGNMENT 1

FALL 2020

SET: 12

Please write your Name, ID and Section on the first page of the assignment answer script - you have to do this for both handwritten or \LaTeX submission. The last date of submission is "2/11/2020". Solve all problems.

You can only submit a PDF file - image or doc files won't be accepted. Before submitting the PDF, please rename the PDF file in the format - SET_ID_SECTION.

*Answer the questions by yourself. Plagiarism will lead to an F grade in the course. **Total marks is "250"**. It will be converted to 25 and if you do your work using \LaTeX you will get a bonus 50 marks. Which will be converted to 5. So highest marks you can get out of 25 is 30 provided you do everything correct and you submit your assignment in*

1. Evaluate the following integral by interpreting it as **area**, or otherwise:

$$\int_{-1}^5 |x - 3|$$

2. Evaluate the following indefinite integral with a substitution, or otherwise:

$$\int \frac{x}{\sqrt{4 - x^2}} dx \quad \text{where } (4 \geq x^2)$$

3. (a) If $I_n = \int x^{n-1} e^x dx$, by using integration by parts, prove that

$$I_n = x^{n-1} e^x - (n-1) I_{n-1}$$

- (b) Evaluate $I_1 = \int e^x dx$ and use the reduction formula in part (a) to calculate I_3

4. Evaluate the following integral by decomposing it into partial fractions, or otherwise:

$$\int \frac{2x+7}{x^2-16x+55}$$

5. Evaluate the following improper integral with the help of Gamma functions, or otherwise:

$$\int_0^\infty (3t)^7 e^{(-3t)} dt$$