

Assignment 1

*Please write your name and ID on the assignment script. The deadline for submitting the assignment is **Thursday, 16 July 2020**. Solve **all the problems**. You will receive 5 bonus marks for **submitting your assignment in LaTeX**.*

Any information you need to solve this exam are given in the question.

Watch the videos in this Playlist if you are confused about the assignment process: [All About Assignments Playlist, Click Here](#)

*Be creative, use your intuition. Answer the questions by yourself. Cheating and Copying will lead to **50%** deduction from your total marks in the course and a Zero in the assignment. **Total marks is 50**. Each question carries 10 marks.*

1. Evaluate the following definite integrals:

(a) $\int_1^2 \frac{1}{\sqrt{x}\sqrt{4-x}} dx$

(b) $\int_{\frac{\pi}{2}}^{\pi} 6 \sin x (\cos x + 1)^5 dx$

2. Solve for

$$\int [\ln(x)]^3 dx.$$

Hint: Use the Reduction Method.

3. Evaluate $\int_0^3 f(x) dx$ if

$$f(x) = \begin{cases} x^2 & x < 2 \\ x - 2 & x \geq 2 \end{cases};$$

4. State whether the following integral converges or diverges. Why or why not?
You may prove your statement via calculation.

$$\int_3^4 \frac{1}{(x-3)^2} dx$$

5. Evaluate the following definite integrals:

(a) $\int_0^{\frac{\pi}{4}} 4\sin x \cos x \, dx$

(b) $\int_1^2 \frac{1}{\sqrt{y}\sqrt{4-y}} \, dy$

(c) $\int_{\frac{\pi}{3}}^{\frac{\pi}{2}} \sin \theta \sqrt{1-4\cos^2 \theta} \, d\theta$