

Universiti Teknologi Malaysia
Department of Mathematics

SSCE 1693 Engineering Mathematics

Instruction: Answer all questions.

Test 2(25%)

Time: 90 minutes

1. Evaluate $\int_2^3 \frac{dx}{\sqrt{x^2 - x}}.$

[5 marks]

2. Use an appropriate substitution to evaluate

$$\int \frac{(\sin^{-1} x)^2}{\sqrt{1 - x^2}} dx$$

[6 marks]

3. Evaluate $\int_1^\infty \frac{dx}{4x^2 + 1}.$

[5 marks]

4. Determine if the integral $\int_0^3 \frac{dx}{(x - 1)^2}$ converges or diverges.

[6 marks]

5. Evaluate

$$\int \frac{dx}{\sqrt{4x^2 + 16x - 5}}.$$

[7 marks]

6. Evaluate $\int \tanh^{-1}(2x + 1) dx.$

[7 marks]

7. Evaluate the following limits using Maclaurin's Series

$$\lim_{x \rightarrow 0} \frac{3 \tan x - 3x - x^3}{x^5}.$$

[7 marks]

8. Approximate the following definite integrals using Maclaurin's Series by taking the first 6 terms.

$$\int_0^{0.15} \frac{\sin x}{x} dx.$$

[7 marks]