

Answer the problems on separate paper. You do not need to rewrite the problem statements on your answer sheets. Do your own work. Show all relevant steps which lead to your solutions. Retain this question sheet for your records.

Part I. Do all problems.

1. Use integration by parts to find $\int x^2 \sin(1-x) dx$

2. Use partial fractions to find $\int \frac{x^3+x^2}{x^2+x-2} dx$

3. Use trigonometric substitution to find $\int \frac{\sqrt{z^2-16}}{z} dz$

4. Determine whether $\int_1^{\infty} \frac{dx}{e^x - e^{-x}}$ converges.

Part II. Do any four problems.

1. $\int \frac{t+2}{\sqrt{4-t^2}} dt$

4. $\int_{\pi/4}^{\pi/2} \sqrt{1 + \cos(4x)} dx$

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

5. $\int \frac{y dy}{3+y^4}$

3. $\int \frac{e^t dt}{e^{2t}+3e^t+2}$

6. $\int \cos(\ln x) dx$