

Part I - Calculations. Find the following integrals:

1. (15 points) $\int \frac{dx}{x(x^2 + 1)^2}$

2. (10 points) $\int \frac{1 - \cos x + \sin x}{\sin^2 x} dx$

3. (10 points) $\int \frac{\cos(\sin^{-1} x)}{\sqrt{1 - x^2}} dx$

4. (15 points) $\int \frac{\sqrt{9 - w^2}}{w^2} dw$

5. (10 points) $\int_0^3 \frac{3}{x - 1} dx$

6. (15 points) $\int \frac{x^3 + x^2}{x^2 + x - 2} dx$

7. (15 points) $\int_1^\infty \frac{\ln y}{y^3} dy$