



Edexcel A Level FM Revision Questions

Integration

Question 1

- (i) Determine $\int \frac{2x^2 - x + 5}{(x-3)(x+2)^2} dx$
- (ii) Determine $\int_0^{\sqrt{2}} \frac{(x+1)(x^2+1)}{(x+2)(x^2+2)} dx$

Question 2

Determine the following integrals, using a substitution if necessary:

- (i) $\int \frac{e^x}{e^{2x} + 1} dx$
- (ii) $\int \frac{x}{1+x^4} dx$
- (iii) $\int \frac{1}{x^2 + 6x + 18} dx$
- (iv) $\int \frac{1}{(2x^2 + 3)^{\frac{3}{2}}} dx$
- (v) $\int \frac{4x + 5}{\sqrt{4 - 6x - x^2}} dx$

Question 3

The region between the line $y = 6 - 2x$ and the curve $y = \frac{4}{x}$ is rotated about the y -axis through 360° . Find the exact volume generated.

Question 4

The region between the parabola $y^2 = 4x$, the x -axis and the line $x = 1$ is rotated about the x -axis through 360° .

- (i) Find the exact volume generated:
- (a) by integrating with respect to x
- (b) by integrating with respect to the parameter t , where $x = t^2$ and $y = 2t$.
- (ii) Use the mean value of the function to carry out a rough check on your answer in (i).