CLASS XII
GUESS PAPER
MATHS

INTEGRATION

1. Find $\int e^x \cos x \, dx$.

2. Using the substitution $u = \frac{1}{2} x + 1$, or otherwise, find the integral

    $$\int x \sqrt{\frac{1}{2} x + 1} \, dx.$$

3. Find $\int e^{2x} \sin x \, dx$.

4. Using the substitution $2x = \sin \theta$, or otherwise, find $\int \left(\sqrt{1 - 4x^2} \right) dx$.

5. Use the substitution $u = x + 2$ to find $\int \frac{x^3}{(x+2)^2} \, dx$.

6. (a) Express as partial fractions $\frac{2x+4}{(x^2+4)(x-2)}$.

    (b) Hence or otherwise, find $\int \frac{2x+4}{(x^2+4)(x-2)} \, dx$.

7. Using the substitution $y = 2 - x$, or otherwise, find $\int \left(\frac{x}{2-x} \right)^2 dx$.

8. Find $\int (\theta \cos \theta - \theta) d\theta$.

9. Find $\int \ln x \, dx$.

10. Find $\int \dfrac{\ln x}{\sqrt{x}} \, dx$.

11. Let $f(x) = x \cos 3x$.

Use integration by parts to show that

$$\int f(x) \, dx = \frac{1}{3} x \sin 3x + \frac{1}{9} \cos 3x + c.$$

12. Use integration by parts to find $\int x^2 \ln x \, dx$.

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