

## INTEGRATION PROBLEMS

1.  $\int (2x^3 + 5x + 1)e^{2x} dx$

2.  $\int e^{\cos 2x} \sin x \cos x dx$

3.  $\int \frac{\sec^2 x}{2 + \tan x} dx$

4.  $\int \frac{e^x}{\sqrt{3 - e^{2x}}} dx$

5.  $\int \frac{1}{\sqrt{x}(1 + 3\sqrt{x})} dx$

6.  $\int_1^2 x^3 \ln x dx$

7.  $\int_{\pi/6}^{\pi/3} \frac{1}{1 + \cos x} dx$

8.  $\int \frac{e^{2x}}{4 + e^{2x}} dx$

9.  $\int_{-4}^2 \frac{4}{x^2 + 2x + 10} dx$

10.  $\int \cos(4x) \sqrt{1 + \sin(4x)} dx$

11.  $\int \frac{1 - \sin x}{\cos x} dx$

12.  $\int \frac{dx}{x\sqrt{\ln x}}$

13.  $\int \frac{x + 1}{x^2 - 4} dx$

## ANSWERS

Question	Method	Solution
1.	integration by parts	$e^{2x}(x^3 - \frac{3}{2}x^2 + 4x - \frac{3}{2}) + C$
2.	exponential form with trig identity	$-\frac{1}{4}e^{\cos 2x} + C$
3.	log form	$\ln  2 + \tan x  + C$
4.	inverse trig form	$\sin^{-1}(\frac{e^x}{\sqrt{3}}) + C$
5.	log form	$\frac{2}{3} \ln  1 + 3\sqrt{x}  + C$
6.	integration by parts	$4 \ln 2 - \frac{15}{16}$
7.	trig identity	$\frac{4\sqrt{3}-6}{3}$
8.	log form	$\frac{1}{2} \ln  4 + e^{2x}  + C$
9.	inverse trig form	$\frac{2\pi}{3}$
10.	general power form	$\frac{1}{6}(1 + \sin 4x)^{3/2} + C$
11.	split up the fraction	$\ln  1 + \sin x  + C$
12.	general power form	$2\sqrt{\ln x} + C$
13.	partial fractions	$\frac{3}{4} \ln  x - 2  + \frac{1}{4} \ln  x + 2  + C$