

**Evaluate the following integrals.** The point here is not to have someone tell you which method to use, but to learn to decide for yourself. It is natural to try one technique and have it fail. Struggle with the ones you find difficult for a while before you seek help.

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

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

3.  $\int \frac{x}{1+x^2} dx$

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

5.  $\int \tan^2 \theta \sec^2 \theta d\theta$

6.  $\int \frac{\sec(\ln x) \tan(\ln x)}{x} dx$

7.  $\int \frac{e^{\sqrt{x}}}{\sqrt{x}} dx$

8.  $\int e^t \sin e^t dt$

9.  $\int \sin \theta \cos \theta d\theta$

10.  $\int \frac{e^x}{1+e^{2x}} dx$

11.  $\int \frac{\sec \theta \tan \theta}{1+\sec \theta} d\theta$

12.  $\int \frac{4e^{2x} - 4e^{4x}}{\sqrt{1-e^{4x}}} dx$

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

14.  $\int_1^2 \frac{e^{1/x}}{x^2} dx$

15.  $\int_1^4 \frac{1}{\sqrt{y}(\sqrt{y}+1)^3} dy$

16.  $\int_e^{e^4} \frac{1}{x\sqrt{\ln x}} dx$

17.  $\int_0^{1/2} \frac{\sin^{-1} x}{\sqrt{1-x^2}} dx$

18.  $\int_{-3}^0 (8-2x)\sqrt{9-x^2} dx$

# Answers

1.  $\frac{-1}{x} + \ln|x| - x + C$
2.  $\frac{1}{2} \sin^{-1}(x^2) + C$
3.  $\frac{1}{2} \ln(x^2 + 1) + C$
4.  $\frac{1}{2} \ln(x^2 + 1) + \tan^{-1} x + C$
5.  $\frac{1}{3} \tan^3 \theta + C$
6.  $\sec(\ln x) + C$
7.  $2e^{\sqrt{x}} + C$
8.  $-\cos(e^t) + C$
9.  $\frac{\sin^2 \theta}{2} + C$
10.  $\tan^{-1} e^x + C$
11.  $\ln|1 + \sec \theta| + C$
12.  $2 \sin^{-1}(e^{2x}) + 2\sqrt{1 - e^{4x}} + C$
13.  $e^{\tan^{-1} x} + C$
14.  $e - \sqrt{e}$
15.  $\frac{5}{36}$
16. 2
17.  $\frac{\pi^2}{72}$
18.  $18(\pi + 1)$