

1-4: Evaluate the indefinite integral.

1.  $\int \cot x \, dx$

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

3.  $\int x(2x+5)^8 \, dx$

4.  $\int x^3 \sqrt{x^2+1} \, dx$

5-16: Evaluate the definite integral

5.  $\int_0^1 \cos\left(\frac{\pi t}{2}\right) dt$

6.  $\int_0^1 (3t-1)^{50} dt$

7.  $\int_0^1 \sqrt[3]{1+7x} \, dx$

8.  $\int_0^\pi \sec^2\left(\frac{t}{4}\right) dt$

$$9. \int_1^2 \frac{e^{\frac{1}{x}}}{x^2} dx$$

$$10. \int_0^1 x e^{-x^2} dx$$

$$11. \int_0^{\frac{\pi}{2}} \cos x \sin(\sin x) dx$$

$$12. \int_0^a x \sqrt{a^2 - x^2} dx$$

$$13. \int_0^a x \sqrt{x^2 + a^2} dx$$

$$14. \int_1^2 x \sqrt{x-1} dx$$

$$15. \int_{-3}^0 \frac{2x}{(x^2+1)^2} dx$$

$$16. \int_0^1 18x^2 (3x^3 - 4)^2 dx$$

**Answers:**

- |    |   |    |  |    |  |
|----|---|----|--|----|--|
| 1  | $\ln \sin x  + C$   | 2  | $\frac{2}{7}(2+x)^{\frac{7}{2}} - \frac{8}{5}(2+x)^{\frac{5}{2}} + \frac{8}{3}(2+x)^{\frac{3}{2}} + C$ | 3  | $\frac{5}{36}(2x+5)^9 - \frac{1}{40}(2x+5)^{10} + C$ |
| 4  | $\frac{1}{5}(x^2+1)^{\frac{7}{2}} - \frac{1}{3}(x^2+1)^{\frac{3}{2}} + C$ | 5  | $\frac{2}{\pi}$  | 6  | $\frac{2^{51}}{153} + \frac{1}{153}$                 |
| 7  | $\frac{45}{28}$   | 8  | 4  | 9  | $e - e^{\frac{1}{2}}$                                |
| 10 |   | 10 |  | 10 | $\frac{1}{2} - \frac{1}{2e}$                         |
| 11 | $-\cos 1 + 1$   | 12 | $\frac{a^3}{3}$  | 13 | $\frac{2\sqrt{2}-1}{3}a^3$                           |
| 14 |   | 14 |  | 14 | $\frac{16}{15}$                                      |
| 15 | $-\frac{9}{10}$   | 16 | 42   |    |  |