

**Find the antiderivative.**

1.  $\int -9 \cos \pi x \, dx$

2.  $\int e^{-12x} \, dx$

3.  $\int \csc(8x) \cot(8x) \, dx$

4.  $\int 6\sqrt{2x-5} \, dx$

5.  $\int (\cos^3 x)(\sin x) \, dx$

6.  $\int \frac{3x^2 + 3}{(x^3 + 3x + 2)^4} \, dx$

7.  $\int \cos(2x) \cdot (5 + \sin(2x))^6 \, dx$

8.  $\int \frac{x^4}{\sqrt[3]{x^5 + 8}} \, dx$

9.  $\int (6^{x^2}) 5x \, dx$

10.  $\int \cos(3x) \cdot 5x^2 \, dx$

11.  $\int (x^3 + 3x) e^{2x} \, dx$

12.  $\int 2x^3 \cdot \ln x \, dx$

13.  $\int \frac{e^{5x}}{1+e^{5x}} \, dx$

**Find the definite integrals.**

14.  $\int_1^e -4x^{-1} \, dx$

15.  $\int_0^2 \frac{2x}{\sqrt{3+4x^2}} \, dx$

16.  $\int_0^1 2x \cdot e^{3x} \, dx$

17.  $\int_0^{\pi} 3x^2 \cos(x) \, dx$

18.  $\int_{.5}^1 5^{2x-1} \, dx$

**Find the general solution of the differential equation.**

19.  $\frac{dy}{dx} = \frac{2x}{y^3}$

20.  $\frac{dy}{dx} = 6yx$

**Find the particular solution of the differential equation.**

21.  $\frac{dy}{dx} = 10x + 5$ ;  $y = -4$  when  $x = -3$

22.  $\frac{dy}{3x} = \frac{4 \, dx}{2y}$ ;  $y(-1) = 3$