

Integration by Substitution

Evaluate each indefinite integral. Use the provided substitution.

1) $\int -15x^4(-3x^5 - 1)^5 dx; u = -3x^5 - 1$

$$\frac{1}{6}(-3x^5 - 1)^6 + C$$

2) $\int -16x^3(-4x^4 - 1)^{-5} dx; u = -4x^4 - 1$

$$-\frac{1}{4(-4x^4 - 1)^4} + C$$

3) $\int -\frac{8x^3}{(-2x^4 + 5)^5} dx; u = -2x^4 + 5$

$$-\frac{1}{4(-2x^4 + 5)^4} + C$$

4) $\int (5x^4 + 5)^{\frac{2}{3}} \cdot 20x^3 dx; u = 5x^4 + 5$

$$\frac{3}{5}(5x^4 + 5)^{\frac{5}{3}} + C$$

5) $\int \frac{(5 + \ln x)^5}{x} dx; u = 5 + \ln x$

$$\frac{1}{6}(5 + \ln x)^6 + C$$

6) $\int 4 \sec 4x \cdot \tan 4x \cdot \sec^4 4x dx; u = \sec 4x$

$$\frac{1}{5} \cdot \sec^5 4x + C$$

7) $\int 36x^3(3x^4 + 3)^5 dx; u = 3x^4 + 3$

$$\frac{1}{2}(3x^4 + 3)^6 + C$$

8) $\int x(4x - 1)^4 dx; u = 4x - 1$

$$\frac{1}{96}(4x - 1)^6 + \frac{1}{80}(4x - 1)^5 + C$$

Evaluate each indefinite integral.

$$9) \int -9x^2(-3x^3 + 1)^3 dx$$
$$\frac{1}{4}(-3x^3 + 1)^4 + C$$

$$10) \int 12x^3(3x^4 + 4)^4 dx$$
$$\frac{1}{5}(3x^4 + 4)^5 + C$$

$$11) \int -12x^2(-4x^3 + 2)^{-3} dx$$
$$-\frac{1}{2(-4x^3 + 2)^2} + C$$

$$12) \int (3x^5 - 3)^{\frac{3}{5}} \cdot 15x^4 dx$$
$$\frac{5}{8}(3x^5 - 3)^{\frac{8}{5}} + C$$

$$13) \int (-2x^4 - 4)^4 \cdot -32x^3 dx$$
$$\frac{4}{5}(-2x^4 - 4)^5 + C$$

$$14) \int (e^{4x} - 4)^{\frac{1}{5}} \cdot 8e^{4x} dx$$
$$\frac{5}{3}(e^{4x} - 4)^{\frac{6}{5}} + C$$

$$15) \int x(4x + 5)^3 dx$$
$$\frac{1}{80}(4x + 5)^5 - \frac{5}{64}(4x + 5)^4 + C$$

$$16) \int 5x\sqrt{2x + 3} dx$$
$$\frac{1}{2}(2x + 3)^{\frac{5}{2}} - \frac{5}{2}(2x + 3)^{\frac{3}{2}} + C$$

Integration by Substitution

Evaluate each indefinite integral. Use the provided substitution.

$$1) \int \frac{20x^4}{4x^5 + 3} dx; u = 4x^5 + 3$$
$$\ln |4x^5 + 3| + C$$

$$2) \int 36x^2 e^{4x^3 + 3} dx; u = 4x^3 + 3$$
$$3e^{4x^3 + 3} + C$$

$$3) \int 80x^3 \cdot 3^{5x^4 - 2} dx; u = 5x^4 - 2$$
$$\frac{4 \cdot 3^{5x^4 - 2}}{\ln 3} + C$$

$$4) \int \frac{2}{x(-1 + \ln 4x)} dx; u = -1 + \ln 4x$$
$$2 \ln |-1 + \ln 4x| + C$$

Evaluate each indefinite integral.

$$5) \int \frac{12x^2}{x^3 + 2} dx$$
$$4 \ln |2x^3 + 4| + C$$

$$6) \int \frac{20e^{5x}}{e^{5x} + 3} dx$$
$$4 \ln |e^{5x} + 3| + C$$

$$7) \int 10 \sin -2x \cdot e^{\cos -2x} dx$$
$$5e^{\cos -2x} + C$$

$$8) \int \frac{5e^{-3 + \ln 3x}}{x} dx$$
$$5e^{-3 + \ln 3x} + C$$

Integration by Substitution

Evaluate each indefinite integral. Use the provided substitution.

$$1) \int 20x \sin(5x^2 - 3) dx; u = 5x^2 - 3$$

$$-2 \cos(5x^2 - 3) + C$$

$$2) \int 16x^3 \cdot \sec^2(4x^4 - 2) dx; u = 4x^4 - 2$$

$$\tan(4x^4 - 2) + C$$

$$3) \int 6e^{3x} \cos(e^{3x} - 5) dx; u = e^{3x} - 5$$

$$2 \sin(e^{3x} - 5) + C$$

$$4) \int \frac{50x}{\sec(5x^2 + 5)} dx; u = 5x^2 + 5$$

$$5 \sin(5x^2 + 5) + C$$

Evaluate each indefinite integral.

$$5) \int -36x^3 \sec(3x^4 + 3) \cdot \tan(3x^4 + 3) dx$$

$$-3 \sec(3x^4 + 3) + C$$

$$6) \int -9 \sec^{-3} x \cdot \tan^{-3} x \cdot \sec^2(\sec^{-3} x) dx$$

$$3 \tan(\sec^{-3} x) + C$$

$$7) \int -\frac{5 \cos(-4 + \ln 4x)}{x} dx$$

$$-5 \sin(-4 + \ln 4x) + C$$

$$8) \int \frac{4x^3}{\csc(x^4 - 1)} dx$$

$$-\cos(x^4 - 1) + C$$

Integration by Substitution

Evaluate each indefinite integral. Use the provided substitution.

$$1) \int \frac{20x^3}{\sqrt{25 - 25x^8}} dx; u = 5x^4$$

$$\sin^{-1} \frac{5x^4}{5} + C$$

$$2) \int \frac{10x^4}{9 + 4x^{10}} dx; u = 2x^5$$

$$\frac{1}{3} \cdot \tan^{-1} \frac{2x^5}{3} + C$$

$$3) \int -\frac{2 \cdot \csc^2 2x}{\cot(2x) \cdot \sqrt{\cot^2 2x - 1}} dx; u = \cot 2x$$

$$\sec^{-1} |\cot 2x| + C$$

$$4) \int \frac{1}{x\sqrt{25 - (\ln -2x)^2}} dx; u = \ln -2x$$

$$\sin^{-1} \frac{\ln -2x}{5} + C$$

Evaluate each indefinite integral.

$$5) \int \frac{8x}{\sqrt{9 - 16x^4}} dx$$

$$\sin^{-1} \frac{4x^2}{3} + C$$

$$6) \int \frac{3x^2}{x^3\sqrt{x^6 - 1}} dx$$

$$\sec^{-1} |x^3| + C$$

$$7) \int \frac{10x}{16 + 25x^4} dx$$

$$\frac{1}{4} \cdot \tan^{-1} \frac{5x^2}{4} + C$$

$$8) \int -\frac{4\sin 4x}{\sqrt{9 - \cos^2 4x}} dx$$

$$\sin^{-1} \frac{\cos 4x}{3} + C$$