

SET 3 - SOLUTIONS

① $u = \cos x$
 $du = -\sin x dx$
 $dx = \frac{du}{-\sin x}$

$$-\int u^3 du = -\frac{(\cos x)^4}{4} + C$$

② $u = 4 - x^2$
 $du = -2x dx$
 $dx = \frac{du}{-2x}$

$$\int u^{1/2} du = \frac{2}{3}(4 - x^2)^{3/2} + C$$

③ $u = 1 - 4t^3$
 $du = -12t^2 dt$
 $dt = \frac{du}{-12t^2}$

$$-\frac{1}{6} \int u^{1/2} du = -\frac{1}{9}(1 - 4t^3)^{3/2} + C$$

④ $u = 1 + 2x$
 $du = 2 dx$
 $dx = \frac{du}{2}$

$$2 \int u^{-3} du = -\frac{1}{2}(1 + 2x)^{-2} + C$$

⑤ $-6 \cos\left(\frac{x}{2}\right) + C$

⑥ $u = 1 - e^x$
 $du = -e^x dx$
 $dx = \frac{du}{-e^x}$

$$-\int \cos(u) du = -\sin(1 - e^x) + C$$

⑦ $u = \ln x$
 $du = \frac{dx}{x}$
 $dx = x du$

$$\int u^5 du = \frac{(\ln x)^6}{6} + C$$

⑧ $u = 2 + \sec(3x)$
 $du = 3 \sec(3x) \tan(3x) dx$
 $dx = \frac{du}{3 \sec(3x) \tan(3x)}$

$$\frac{1}{3} \int u^{-1/3} du = \frac{1}{2}(2 + \sec(3x))^{2/3} + C$$

9

$$u = \sin x$$
$$du = \cos x dx$$
$$dx = \frac{du}{\cos x}$$

$$\int \cos(u) du = \sin(\sin x) + C$$

10

$$u = \frac{2}{x}$$
$$du = \frac{-2}{x^2} dx$$
$$dx = \frac{x^2 du}{-2}$$

$$-\frac{1}{2} \int e^u du = -\frac{1}{2} e^{2/x} + C$$

11

$$\frac{4}{5} x^5 - \frac{1}{3} x^3 + x + C$$

12

$$\frac{x^6}{6} - \cos x + C$$

13

$$\sqrt{\cos(2x)}$$

14

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

EXPAND