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<https://physicsaholics.com/home/courseDetails/36>

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<https://youtu.be/B8q0FwLlIkE>

Written Solution on Website:-

<https://physicsaholics.com/note/notesDetails/70>

- Q 1. Find  $\int_1^3 x dx = ?$   
(a) 2 (b) 4 (c) 6 (d) 8
- Q 2. Find  $\int_{-2}^1 (5z^2 - 7z + 3) dz = ?$   
(a) 69 (b)  $-\frac{69}{2}$  (c)  $\frac{69}{2}$  (d)  $\frac{89}{2}$
- Q 3. Find  $\int_0^{\frac{\pi}{2}} (7 \sin t - 2 \cos t) dt = ?$   
(a)  $\pi$  (b) 5 (c)  $\frac{\pi}{2}$  (d)  $\frac{5}{2}$
- Q 4. Find  $\int_5^2 \left(\frac{2}{y}\right) dy = ?$   
(a)  $2 \ln(2 - 5)$  (b)  $\ln \frac{2}{5}$   
(c)  $2 \ln 2 - \ln 5$  (d)  $2 \ln \frac{2}{5}$
- Q 5. Find  $\int_{-1}^1 (2e^x) dx = ?$   
(a)  $2 \left(\frac{e^2 - 1}{e}\right)$  (b)  $2 \left(\frac{e^2}{e - 1}\right)$   
(c)  $2(e^2)$  (d)  $2(e^2 - 1)$
- Q 6. Find  $\int_1^2 \left(x^2 + \frac{1}{x^2}\right) dx = ?$   
(a) 17 (b)  $\frac{17}{6}$   
(c) 27 (d)  $\frac{27}{6}$
- Q 7. Find  $\int_e^{e^2} \frac{dx}{x} = ?$   
(a) 1 (b)  $\frac{1}{2}$   
(c)  $e$  (d)  $\frac{1}{e}$
- Q 8. Find  $\int_0^{\frac{\pi}{2}} \sin \left(2x + \frac{\pi}{4}\right) dx = ?$   
(a)  $\frac{1}{2}$  (b)  $\frac{1}{\sqrt{2}}$



(c)  $\frac{1}{2\sqrt{2}}$

(d)  $\sqrt{2}$

Q 9. Find  $\int_0^1 \frac{1}{(x+1)} dx = ?$

(a) zero

(b)  $\ln 2$

(c)  $\ln 3$

(d)  $2 \ln 2$

Q 10. Find  $\int_{-1}^1 (3x + 2)^3 dx = ?$

(a) 50

(b) 51

(c) 52

(d) 53

Q 11. Find  $\int_0^4 \frac{1}{\sqrt{x}} dx = ?$

(a) 1

(b) 2

(c) 3

(d) 4

Q 12. Find  $\int_0^{\frac{\pi}{2}} (e^x + \sin x) dx = ?$

(a)  $e^{\frac{\pi}{2}}$

(b)  $e^{\frac{\pi}{2}} + 1$

(c)  $e^{\frac{\pi}{2}} - 1$

(d) 1

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## Answer Key

Q.1 b	Q.2 c	Q.3 b	Q.4 d	Q.5 a
Q.6 b	Q.7 a	Q.8 b	Q.9 b	Q.10 c
Q.11 d	Q.12 a			



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# **Written Solution**

**DPP-8 Basic Maths: Definite Integration**

**By Physicsaholics Team**

Solution: 1

$$I = \int_1^3 x \, dx$$

$$I = \left[ \frac{x^2}{2} + C \right]_1^3$$

$$I = \left( \frac{3^2}{2} + C \right) - \left( \frac{1^2}{2} + C \right)$$

$$I = \frac{3^2}{2} - \frac{1^2}{2} = \frac{9-1}{2}$$

$$\boxed{I = 4}$$

Ans. b

Solution: 2

$$I = \int_{-2}^1 (5z^2 - 7z + 3) dz$$

$$I = \left( \frac{5z^3}{3} - \frac{7z^2}{2} + 3z \right) \Big|_{-2}^1$$

$$I = \left( \frac{5}{3} - \frac{7}{2} + 3 \right) - \left( \frac{-40}{3} - \frac{28}{2} - 6 \right)$$

$$I = \frac{+45}{3} + \frac{+21}{2} + 9 = \frac{207}{6}$$

$$I = \frac{69}{2}$$

Ans. c



Solution: 3

$$I = \int_0^{\pi/2} (7 \sin t - 2 \cos t) dt$$

$$= \int_0^{\pi/2} (7 \sin t) dt - \int_0^{\pi/2} 2 \cos t dt$$

$$= 7 \int_0^{\pi/2} (\sin t) dt - 2 \int_0^{\pi/2} (\cos t) dt$$

$$= 7 (-\cos t) \Big|_0^{\pi/2} - 2 (\sin t) \Big|_0^{\pi/2}$$

$$= 7 [-\cos \frac{\pi}{2} + \cos 0] - 2 (\sin \frac{\pi}{2} - \sin 0)$$

$$= 7 [-0 + 1] - 2 [1 - 0]$$

$$= 7 - 2$$

$$\boxed{I = 5}$$

Ans. b

Solution: 4

$$I = \int_{+5}^{+2} \left(\frac{2}{y}\right) dy = 2 \int_{+5}^{+2} \frac{1}{y} dy$$

$$I = 2 \left[ \ln(y) \right]_{+5}^{+2} = 2 \left[ \ln(2) - \ln(5) \right]$$

$$I = 2 \ln\left(\frac{2}{5}\right)$$

Ans. d



Solution: 5

$$I = \int_{-1}^1 (2e^x) dx = 2 \int_{-1}^1 e^x dx$$

$$= 2 [e^x]_{-1}^1$$

$$= 2 (e^1 - e^{-1})$$

$$= 2 \left( e - \frac{1}{e} \right)$$

$$I = 2 \left( \frac{e^2 - 1}{e} \right)$$

Ans. a

Solution: 6

$$I = \int_1^2 (x^2 + x^{-2}) dx$$

$$I = \left( \frac{x^3}{3} + \frac{x^{-2+1}}{-2+1} \right)_1^2$$

$$I = \left[ \frac{x^3}{3} - \frac{1}{x} \right]_1^2$$

$$I = \left[ \left( \frac{8}{3} - \frac{1}{2} \right) - \left( \frac{1}{3} - 1 \right) \right]$$

$$I = \frac{7}{3} + \frac{1}{2}$$

$$I = \frac{17}{6}$$

Ans. b

Solution: 7

$$I = \int_e^{e^2} \frac{dx}{x} = [\ln(x)]_e^{e^2}$$

$$I = \ln e^2 - \ln e$$

$$I = 2 \ln e - \ln e$$

$$I = 2(1) - (1)$$

$$I = 2 - 1$$

$$\boxed{I = 1}$$

Ans. a

Solution: 8

$$I = \int_0^{\frac{\pi}{2}} \sin(2x + \frac{\pi}{4}) dx$$

Now;  $\int \sin(2x + \frac{\pi}{4}) dx = ?$

$$\therefore \int \sin(ax + b) dx = \frac{-\cos(ax + b)}{a} + c$$

$$I = \left[ \frac{-\cos(2x + \frac{\pi}{4})}{2} \right]_0^{\frac{\pi}{2}}$$

$$= \left[ -\frac{1}{2} \cos(\pi + \frac{\pi}{4}) \right] - \left[ -\frac{1}{2} \cos(\frac{\pi}{4}) \right]$$

$$= \frac{1}{2} \cos \frac{\pi}{4} + \frac{1}{2} \cos \frac{\pi}{4}$$

$$= \cos \frac{\pi}{4} = \frac{1}{\sqrt{2}}$$

Ans. b



Solution: 9

$$I = \int_0^1 \frac{1}{(x+1)} dx$$

$$\therefore \int \frac{1}{ax+b} dx = \frac{\ln(ax+b)}{a} + C$$

$$\therefore I = \int_0^1 \frac{1}{x+1} dx = \left[ \frac{\ln(x+1)}{1} \right]_0^1$$

$$I = \ln(2) - \ln(1)$$

$$I = \ln(2) - 0$$

$$I = \ln(2)$$

Ans. b



Solution: 10

$$I = \int_{-1}^1 (3x+2)^3 dx$$

$$\therefore \int (ax+b)^n = \frac{(ax+b)^{n+1}}{a(n+1)} + c$$

$$\therefore I = \int_{-1}^1 (3x+2)^3 dx = \left[ \frac{(3x+2)^4}{3(4)} \right]_{-1}^1$$

$$I = \left[ \frac{(3x+2)^4}{12} \right]_{-1}^1 = \left[ \frac{5^4}{12} - \frac{(-1)^4}{12} \right]$$

$$I = \frac{624}{12} = 52$$

$$\boxed{I = 52}$$

Ans. c

Solution: 11

$$I = \int_0^4 \frac{1}{\sqrt{x}} dx = \int_0^4 x^{-1/2} dx$$

$$= \left[ \frac{x^{-\frac{1}{2}+1}}{-\frac{1}{2}+1} \right]_0^4 = \left[ \frac{x^{1/2}}{1/2} \right]_0^4$$

$$= \left[ 2\sqrt{x} \right]_0^4 = \left[ 2\sqrt{4} - 2\sqrt{0} \right]$$

$$= \left[ 2 \cdot 2 - 0 \right]$$

$$\boxed{I = 4}$$

Ans. d

Solution: 12

$$I = \int_0^{\pi/2} (e^x + \sin x) dx$$

$$= [e^x - \cos x]_0^{\pi/2}$$

$$= [e^{\pi/2} - \cos \frac{\pi}{2}] - (e^0 - \cos 0)$$

$$= [(e^{\pi/2} - 0) - (1 - 1)]$$

$$\boxed{I = e^{\pi/2}}$$

Ans. a

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