

# DAV INSTITUTIONS, ODISHA ZONE- I

D.A.V. PUBLIC SCHOOL, BERHMAPUR, ODISHA

SUBJECT : MATHEMATICS

CLASS : XII

TOPIC : DEFINITE INTEGRAL

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## WORKSHEET – 2 (STANDARD)

### SECTION – A (Each question carry 1 mark)

1.  $\int_0^{\frac{\pi}{2}} \frac{\sin^n x dx}{\sin^n x + \cos^n x}$  is .....

2.  $\int_0^1 \tan^{-1} \left( \frac{2x-1}{1+x-x^2} \right) dx$  is equal to .....

3. If  $f(x) = \int_0^x t \sin t dt$ , then  $f'(x)$  is

(A)  $\cos x + x \sin x$       (B)  $x \sin x$       (C)  $x \cos x$       (D)  $\sin x + x \cos x$

4. Evaluate  $\int_0^{\frac{\pi}{2}} e^x (\sin x - \cos x) dx$ .

5. Evaluate  $\int_0^1 x e^{x^2} dx$ .

### SECTION – B (Each question carry 2 mark)

6. Evaluate :  $\int_{-1}^2 \frac{|x|}{x} dx$ .

7. Evaluate :  $\int_4^9 \frac{\sqrt{x} dx}{(30-x^{\frac{3}{2}})^2}$ .

8. Evaluate :  $\int_0^1 \frac{dx}{e^x + e^{-x}}$ .

9. Prove that :  $\int_0^1 x e^x dx = 1$ .

10. Evaluate :  $\int_0^1 \frac{2x}{5x^2+1} dx$ .

### SECTION – C (Each question carry 4 mark)

11. Show that  $\int_0^a f(x) \cdot g(x) dx = 2 \int_0^a f(x) dx$ , if  $f$  and  $g$  are defined as

$f(x) = f(a-x)$  and  $g(x) + g(a-x) = 4$ .

12. Evaluate :  $\int_{-1}^{3/2} |x \sin(\pi x)| dx$  .

13. Evaluate :  $\int_1^4 [|x - 1| + |x - 2| + |x - 3|] dx$  .

14. Find  $\int_0^1 x(\tan^{-1} x)^2 dx$  .

15. Show that  $\int_0^{\frac{\pi}{2}} \frac{\sin^2 x}{\sin x + \cos x} dx = \frac{1}{\sqrt{2}} \log(\sqrt{2} + 1)$ .

16. Evaluate :  $\int_{-\frac{\pi}{4}}^{\frac{\pi}{4}} \frac{x + \frac{\pi}{4}}{2 - \cos 2x} dx$  .

**SECTION – D (Each question carry 6 mark)**

17. Evaluate :  $\int_1^3 (x^2 + 3x + e^x) dx$  , as the limit of the sum.

18. Evaluate :  $\int_0^{\frac{\pi}{2}} \frac{x \sin x \cdot \cos x}{\cos^4 x + \sin^4 x} dx$  .

19. Evaluate :  $\int_{-\pi}^{\pi} (\cos ax - \sin bx)^2 dx$  .

20. Evaluate :  $\int_0^{\frac{\pi}{4}} \frac{\cos^2 x}{\cos^2 x + 4 \sin^2 x} dx$  .

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