MATHS

BOOKS - SAI MATHS (TELUGU ENGLISH)

DEFINITE INTEGRALS

Problems

1. The area of the region bounded by the curves $y = 9x^2$ and $y = 5x^2 + 4$ (in square units) is

A. 64

B. $\frac{64}{3}$

C. $\frac{32}{3}$

D. $\frac{16}{3}$

Answer: D

View Text Solution

2. $\int_0^{p/2} \frac{16x \sin x \cos x dx}{\sin^4 x + \cos^4 x}$

A. $\frac{\pi^2}{4}$

B. $\frac{\pi^2}{2}$

C. π^2

D. $2\pi^2$

Answer: C

View Text Solution

3. $\int_0^1 \sqrt{\frac{1-x}{1+x}} dx =$

A. $\frac{\pi}{2} - 1$

B. $\frac{\pi}{2} + 1$

C. $\pi - 1$

D. $\frac{3\pi}{2}$

Answer: A

View Text Solution

4. $\int_0^{\frac{\pi}{4}} \frac{\sin x + \cos x}{3 + \sin 2x} dx =$

A. $\frac{1}{2}\log 3$

B. $\log 2$

C. $\log 3$

D. $\frac{1}{4}\log 3$

Answer: D

View Text Solution

5. $\int_{-1}^{1} \frac{\sqrt{1+x+x^2}-\sqrt{1-x+x^2}}{\sqrt{1+x+x^2}+\sqrt{1-x+x^2}}dx =$

A. $\frac{3\pi}{2}$

B. $\frac{\pi}{2}$

C. 0

D. -1

Answer: C

View Text Solution

6. The area of the region described by $\{(x, y)/x^2 + y^2 \leq 1 \text{ and } y^2 \leq 1 - x\}$ is

A. $\frac{\pi}{2} - \frac{2}{3}$

B. $\frac{\pi}{2} + \frac{2}{3}$

C. $\frac{\pi}{2} + \frac{4}{3}$

D. $\frac{\pi}{2} - \frac{4}{3}$

Answer: C

View Text Solution

7. By the definition of the definite integral, the value of

$$\lim_{n-\infty}\left(\frac{1^4}{1^5+n^5}+\frac{2^4}{2^5+n^5}+\frac{3^4}{3^5+n^5}+\ldots+\frac{n^4}{n^5+n^5}\right)$$

is

A. $\log 2$

B. $\frac{1}{5}\log 2$

C. $\frac{1}{4}\log 2$

D. $\frac{1}{3}\log 2$

Answer: B

View Text Solution

8. $\int_0^{\pi/6} \cos^4 3\theta . \sin^2 6\theta d\theta$ equals to

A. $\frac{\pi}{96}$

B. $\frac{5}{192}$

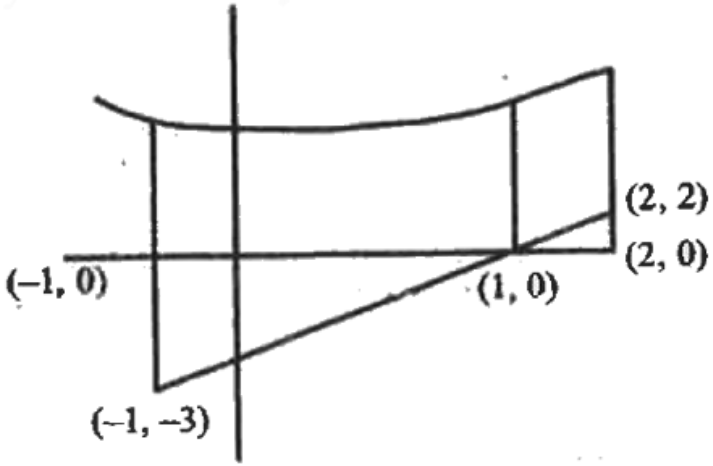
C. $5\frac{\pi}{256}$

D. $5\frac{\pi}{192}$

Answer: D

View Text Solution

9. The area (in sq. units) of the region bounded by $x = -1, x = 2, y = x^2 + 1$ and $y = 2x - 2$ is



A. 10

B. 7

C. 8

D. 9

Answer: D

View Text Solution

10. $\int_0^b \frac{dx}{1+x^2} = \int_b^\infty \frac{dx}{1+x^2}$, then b is equal to

A. $\tan^{-1}\left(\frac{1}{3}\right)$

B. $\frac{\sqrt{3}}{2}$

C. $\sqrt{2}$

D. 1

Answer: D

View Text Solution

11. The area (in sq. units) bounded by the curves $x = -2y^2$ and $x = 1 - 3y^2$ is

A. $\frac{2}{3}$

B. 1

C. $\frac{4}{3}$

D. $\frac{5}{3}$

Answer: C

View Text Solution

12. If $a > 0$, then $\int_{-\pi}^{\pi} \frac{\sin^2 x}{1 + a^x} dx$ is equal to

A. $\frac{\pi}{2}$

B. π

C. $2\frac{\pi}{2}$

D. $a\pi$

Answer: A

View Text Solution

13. The area (in sq. units) bounded by the curves $y^2 = 4x$ and $x^2 = 4y$ is

A. $\frac{64}{3}$

B. $\frac{16}{3}$

C. $\frac{8}{3}$

D. $\frac{2}{3}$

Answer: B

View Text Solution

14. The area (in square units) of the region bounded by the curves $x = y^2$ and $x = 3 - 2y^2$ is

A. $\frac{3}{2}$

B. 2

C. 3

D. 4

Answer: D

View Text Solution

15. If $I_a = \int_0^{\pi/4} \tan^n \theta d\theta$ for $n = 1, 2, 3, \ldots,$ then $I_{n-1} + I_{n+1}$ is equal to

A. 0

B. 1

C. $\frac{1}{n}$

D. $\frac{1}{n+1}$

Answer: C

View Text Solution

16. If $I_n = \int_0^{\pi/2} \tan^n x dx$, then $I_2 + I_4, I_3 + I_5, I_4 + I_6$,...., are in

A. arithmetic progression

B. geometric progression

C. harmonic progression

D. arithmetic-geometric progression

Answer: C

View Text Solution

17. The area (in square units) of the region enclosed by the two circles $x^2 + y^2 = 1$ and $(x-1)^2 + y^2 = 1$ is

A. $\frac{2\pi}{3} + \frac{\sqrt{3}}{2}$

B. $\frac{\pi}{3} + \frac{\sqrt{3}}{2}$

C. $\frac{\pi}{3} - \frac{\sqrt{3}}{2}$

D. $\frac{2\pi}{3} - \frac{\sqrt{3}}{2}$

Answer: D

View Text Solution

18. $\int_0^{\pi} \frac{1}{1+\sin x} dx$ is equal to

A. 1

B. 2

C. -1

D. -2

Answer: B

View Text Solution

19. The line $x = \frac{\pi}{4}$ divides the area of the region bounded by $y = \sin x, y = \cos x$ and x-axis $\left(0 \leq x \leq \frac{\pi}{2}\right)$ into two regions of areas A_1 and A_2.

Then A_1, A_2 equals

A. $4:1$

B. $3:1$

C. $2:1$

D. $1:1$

Answer: D

View Text Solution

20. $\int_0^1 x^{3/2}\sqrt{1-x}dx$ is equal to

A. $\frac{\pi}{6}$

B. $\frac{\pi}{9}$

C. $\frac{\pi}{12}$

D. $\frac{\pi}{16}$

Answer: D

View Text Solution

21. $\int_{-\pi/2}^{\pi/2} \sin|x| dx$ is equal to

A. 0

B. 1

C. 2

D. π

Answer: C

View Text Solution

22. The area (in sq unit) of the region bounded by the curves $2x = y^2 - 1$ and $x = 0$ is

A. $\frac{1}{3}$

B. $\frac{2}{3}$

C. 1

D. 2

Answer: B

View Text Solution

23. If $f(t) = \int_{-t}^{t} \frac{e^{-|x|}}{2} dx$, then $\lim_{t \to \infty} f(t)$ is equal to

A. 1

B. $\frac{1}{2}$

C. 0

D. -1

Answer: A

View Text Solution

24. $\int_{0}^{2x} \sin^6 x \cos^5 x dx$ is equal to

A. 2π

B. $\pi/2$

C. 0

D. $-\pi$

Answer: C

View Text Solution

25. The area (in sq. unit) of the region enclosed by the curves $y = x^2$ and $y = x^3$ is

A. $\frac{1}{12}$

B. $\frac{1}{6}$

C. $\frac{1}{3}$

D. 1

Answer: A

View Text Solution

26. $\int_0^{\pi/2} \frac{dx}{1+\tan^3 x}$ is equal to

A. π

B. $\frac{\pi}{2}$

C. $\frac{\pi}{4}$

D. $3\frac{\pi}{2}$

Answer: C

View Text Solution

27. $\int_{-1}^{1} \frac{\cosh x}{1+e^{2x}}$ dx is equal to

A. 0

B. 1

C. $\frac{e^2-1}{2e}$

D. $\frac{e^2+2}{2e}$

Answer: C

View Text Solution

28. $\int_{0}^{\pi/2} \frac{200\sin x + 100\cos x}{\sin x + \cos x}$ dx is equal to

A. 50π

B. 25π

C. 75π

D. 150π

Answer: C

View Text Solution

29. $\int_0^{\pi} \frac{\theta \sin\theta}{1+\cos^2\theta} d\theta$ is equal to

A. $\frac{\pi^2}{2}$

B. $\frac{\pi^3}{3}$

C. π^2

D. $\frac{\pi^2}{4}$

Answer: D

View Text Solution

30. The area (in sq. unit) bounded by the curves $y^2 = 4x$ and $x^2 = 4y$ in the plane, is

A. $\frac{8}{3}$

B. $\frac{16}{3}$

C. $\frac{32}{3}$

D. $\frac{64}{3}$

Answer: B

View Text Solution

31. $\int_{\frac{-\pi}{2}}^{\frac{\pi}{2}} \log\left(\frac{2-\sin\theta}{2+\sin\theta}\right) d\theta$ is equal to

A. 0

B. 1

C. 2

D. -1

Answer: A

View Text Solution

32. The area bounded by $y = x^2 + 2$, x-axis, $x = 1$ and $x = 2$ is

A. $\frac{16}{3}$ sq. unit

B. $\frac{17}{3}$ sq. unit

C. $\frac{13}{3}$ sq. unit

D. $\frac{20}{3}$ sq. unit

Answer: C

View Text Solution

33. $\int_0^2 \frac{2x-2}{2x-x}$ dx is equal to

A. 0

B. 2

C. 3

D. 4

Answer: A

View Text Solution

34. $\int_{-2}^{2} |[x]| dx$ is equal to

A. 1

B. 2

C. 3

D. 4

Answer: D

View Text Solution

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

A. $\frac{\pi}{6}$

B. $\frac{\pi}{4}$

C. $\frac{\pi}{2}$

D. π

Answer: B

View Text Solution

36. $\int_0^3 \frac{3x+1}{x^2+9}$ dx is equal to

A. $\log\left(2\sqrt{2}\right)+\frac{\pi}{12}$

B. $\log\left(2\sqrt{2}\right)+\frac{\pi}{2}$

C. $\log\left(2\sqrt{2}\right)+\frac{\pi}{6}$

D. $\log\left(2\sqrt{2}\right)+\frac{\pi}{3}$

Answer: A

View Text Solution

37. $\int_2^3 \frac{dx}{x^2-x}$ is equal to

A. $\log. \frac{2}{3}$

B. $\log. \frac{4}{3}$

C. $\log. \frac{8}{3}$

D. $\log. \frac{1}{4}$

Answer: B

View Text Solution

38. $\int_{-\pi/2}^{\pi/2} \sin^4 x \cos^6 x dx$ is equal to

A. $\frac{3\pi}{128}$

B. $\frac{3\pi}{256}$

C. $\frac{3\pi}{572}$

D. $\frac{3\pi}{64}$

Answer: B

View Text Solution

39. $\int_0^{\pi/2} \sin^8 x \cos^2 x dx$ is equal to

A. $\frac{\pi}{512}$

B. $3\frac{\pi}{512}$

C. $5\frac{\pi}{512}$

D. $7\frac{\pi}{512}$

Answer: D

View Text Solution

40. $\int_0^1 (ax^3 + bx) = 0$ for

A. Any value of a and b

B. $a > 0, b > 0$ only

C. $a > 0, b < 0$ only

D. $a < 0, b > 0$ only

Answer: A

View Text Solution

41. The area (in sq. unit) of the region bounded by $x^2 = 8y, x = 4$ and x-axis is

A. $\frac{2}{3}$

B. $\frac{4}{3}$

C. $\frac{8}{3}$

D. $\frac{10}{3}$

Answer: C

View Text Solution

42. Evaluate $\int_{-1}^{1} f(x)dx$, where

$f(x) = (1, 2x, x \leq 0), (1 + 2x, x \geq 0)$

A. 0

B. 2

C. 4

D. 16

Answer: C

View Text Solution