Integral Calculus - 2

Date Planned : __ / __ / __	Daily Tutorial Sheet
Actual Date of Attempt : __ / __ / __	Level - 0

1. $\int_0^2 \left(x^2+3\right)dx$ Using limit as a sum

2. $\int_0^2 e^x dx$ Using limit as a sum

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

4. $\int_0^{\pi/2} \frac{\tan x}{1+m^2\tan^2} x$

5. $\int_1^2 \frac{dx}{\sqrt{(x-1)(2-x)}}$

6. $\int_0^1 \frac{x}{\sqrt{1+x^2}}dx$

7. $\int_0^{\pi} x\sin x\cos^2 x dx$

8. $\int_0^{1/2} \frac{dx}{\left(1+x^2\right)\sqrt{1-x^2}}$

9. $\int_0^{\pi} \frac{x}{1+\sin x}$

10. $\int_{\pi/3}^{\pi/2} \frac{\sqrt{1+\cos x}}{(1-\cos x)^{5/2}}dx$

11. $\int_0^{\pi/2} \frac{dx}{\left(a^2\cos^2 x+b^2\sin^2 x^2\right)^2}$

12. $\int_0^1 x\log(1+2x)dx$

13. $\int_0^{\pi} x\log\sin x dx$

14. $\int_{-\pi/4}^{\pi/4} \log(\sin x+\cos x)dx$

15. $\int_{-\pi/4}^{\pi/4} \frac{dx}{1+\cos 2x}$ is equal to:

(A) 1 **(B)** 2 **(C)** 3 **(D)** 4

16. $\int_0^{\pi/2} \sqrt{1-\sin 2x}\, dx$ is equal to:

(A) $2\sqrt{2}$ **(B)** $2\left(\sqrt{2}+1\right)$ **(C)** 2 **(D)** $2\left(\sqrt{2}-1\right)$

17. $\int_0^{\pi/2} \cos x e^{\sin x} dx$ is equal to:

(A) $e+1$ **(B)** $e-1$ **(C)** e **(D)** $-e$

18. If $\int_0^a \frac{1}{1+4x^2} dx = \frac{\pi}{8}$, then a =..... .

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

20. The value of $\int_{-\pi}^{\pi} \sin^3 x \cos^2 x\, dx$ is ..... .

21. Find the area of the region bounded by the curves $y^2 = 9x$ and $y = 3x$.

22. Find the area of the region bounded by the parabola $y^2 = 2px$ and $x^2 = 2py$.

23. Find the area of the region bounded by the curve $y = x^3$, $y = x + 6$ and $x = 0$.

24. Find the area of the region bounded by the curve $y^2 = 4x$ and $x^2 = 4y$.

25. Find the area of the region included between $y^2 = 9x$ and $y = x$.

26. Find the area of the region enclosed by the parabola $x^2 = y$ and the line $y = x + 2$.

27. Find the area of the region enclosed bounded by line $x = 2$ and parabola $y^2 = 8x$.

28. Sketch the region $\left\{(x, 0) : y = \sqrt{4-x^2}\right\}$ and X-axis: Find the area of the region using integration.

29. Calculate the area under the curve $y = 2\sqrt{x}$ included between the lines $x = 0$ and $x = 1$.

30. Using integration, find the area of the region bounded by the line $2y = 5x + 7$, X-axis and the lines $x = 2$ and $x = 8$.

31. Draw a rough sketch of the curve $y = \sqrt{x-1}$ in the line interval $[1, 5]$. Find the area under the curve and between the lines $x = 1$ and $x = 5$.

32. Determine the area under the curve $y = \sqrt{a^2 - x^2}$ included between the lines $x = 0$ and $x = a$.

33. Find the area of the region bounded by $y = \sqrt{x}$ and $y = x$.

34. Find the area enclosed by the curve $y = -x^2$ and the straight line $x + y + 2 = 0$.

35. Find the area bounded by the curve $y = \sqrt{x}$, $x = 2y + 3$ in the first quadrant and X-axis :

36. Find the area of the region bounded by the curve $y^2 = 2x$ and $x^2 + y^2 = 4x$.

37. Find the area of the region bounded by the curve $y = \sin x$ between $x = 0$ and $x = 2\pi$.

38. Find the area of the region bounded by the triangle whose vertices are $(-1, 1)$, $(0, 5)$ and $(3, 2)$, using integration.

39. Draw a rough sketch of the region $\left\{(x, y) : y^2 \le 6ax \text{ and } x^2 + y^2 \le 16a^2\right\}$. Also, find the area of the region sketched using method of integration.

40. Compute the area bounded by the lines $x + 2y = 2, y - x = 1$ and $2x + y = 7$.

41. Find the area bounded by the lines $y = 4x + 5, y = 5 - x$ and $4y = x + 5$.

42. Find the area bounded by the curve $y = 2\cos x$ and the X-axis from $x = 0$ to $x = 2\pi$.

43. Draw a rough sketch of the given curve $y = 1 + |x + 1|, x = -3, x = 3, y = 0$ and find the area of the region bounded by them, using integration.

44. The area of region bounded by the Y-axis $y = \cos x$ and $y = \sin x$, where $0 \le x \le \frac{\pi}{2}$ is :

(A) $\sqrt{2}\, sq\ units$ **(B)** $\left(\sqrt{2}+1\right) sq\ units$

(C) $\left(\sqrt{2}-1\right) sq\ units$ **(D)** $\left(2\sqrt{2}-1\right) sq\ units$

45. The area of region bounded by the curve $x^2 = 4y$ and the straight line $x = 4y - 2$ is :

(A) $\frac{3}{8} sq\ units$ **(B)** $\frac{5}{8} sq\ units$ **(C)** $\frac{7}{8} sq\ units$ **(D)** $\frac{9}{8} sq\ units$

46. The area of region bounded by the curve $y = \sqrt{16 - x^2}$ and X-axis is :

(A) $8\pi sq\ units$ **(B)** $20\pi sq\ units$ **(C)** $16\pi sq\ units$ **(D)** $256\pi sq\ units$

47. Area of the region in the first quadrant enclosed by the X-axis, the line $y = x$ and the circle $x^2 + y^2 = 32$ is:

(A) $16\pi sq\ units$ **(B)** $4\pi\ sq\ units$ **(C)** $32\pi\ sq\ units$ **(D)** $24\pi\ sq\ units$

48. Area of the region bounded by the curve $y = \cos x$ between $x = 0$ and $x = \pi$ is :

(A) $2 sq\ units$ **(B)** $4 sq\ units$ **(C)** $3 sq\ units$ **(D)** $1 sq\ unit$

49. The area of the region bounded by parabola $y^2 = x$ and the straight line $2y = x$ is:

(A) $\frac{4}{3} sq\ units$ **(B)** $1 sq\ unit$ **(C)** $\frac{2}{3} sq\ units$ **(D)** $\frac{1}{3} sq\ units$

50. The area of the region bounded by the ellipse $\frac{x^2}{25} + \frac{y^2}{16} = 1$ is :

(A) $20\pi sq\ units$ **(B)** $20\pi^2 sq\ units$ **(C)** $16\pi^2 sq\ units$ **(D)** $25\pi sq\ units$

51. The area of the region bounded by the circle $x^2 + y^2 = 1$ is :

(A) $2\pi sq\ units$ **(B)** $\pi sq\ units$ **(C)** $3\pi sq\ units$ **(D)** $4\pi sq\ units$

52. The area of the region bounded by the curve $y = x + 1$ and the lines $x = 2, x = 3$, is :

(A) $\frac{7}{2} sq\ units$ **(B)** $\frac{9}{2} sq\ units$ **(C)** $\frac{11}{2} sq\ units$ **(D)** $\frac{13}{2} sq\ units$

53. The area of the region bounded by the curve $x = 2y + 3$ and the lines $y = 1, y = -1$ is :

(A) $4 sq\ units$ **(B)** $\frac{3}{2} sq\ units$ **(C)** $6 sq\ units$ **(D)** $8 sq\ units$