

Integral Calculus - 2

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

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

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

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

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

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

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

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

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

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

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

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

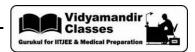
$$12. \qquad \int_0^1 x \log(1+2x) dx$$

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

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

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

(B)



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

(A)
$$2\sqrt{2}$$

(B)
$$2(\sqrt{2}+1)$$

(D)
$$2(\sqrt{2}-1)$$

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

(A)
$$e + 1$$

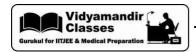
B)
$$e-1$$

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

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

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 $\{(x, 0): y = \sqrt{4 x^2}\}$ 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 $\begin{bmatrix} 1, 5 \end{bmatrix}$. 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 $\{(x, y): y^2 \le 6ax \text{ and } x^2 + y^2 \le 16a^2\}$. 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 $x = 2\pi$.
- 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 43. bounded by them, using integration.
- 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: 44.
 - $\sqrt{2}$ sa units (A)

 $(\sqrt{2} + 1)$ sq units (B)

 $(\sqrt{2}-1)$ sq units (C)

- **(D)** $(2\sqrt{2}-1)$ sq units
- The area of region bounded by the curve $x^2 = 4y$ and the straight line x = 4y 2 is: 45.
 - $\frac{3}{2}$ sq units
- **(B)** $\frac{5}{9}$ sq units **(C)** $\frac{7}{9}$ sq units **(D)** $\frac{9}{9}$ sq units
- The area of region bounded by the curve $y = \sqrt{16 x^2}$ and X-axis is : 46.
 - (A) $8\pi sq$ units
- (B) $20\pi sq$ units
- 16πsq units (C)
- (D) $256\pi sq$ units
- Area of the region in the first quadrant enclosed by the X-axis, the line y = x and the circle $x^2 + y^2 = 32$ 47. is:
 - (A) $16\pi sq$ units
- (B) 4π sa units
- (C) $32\pi sq$ units
- (D) 24π 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
- 4 sq units
- (C) 3 sq units
- (D)
- The area of the region bounded by parabola $y^2 = x$ and the straight line 2y = x is: 49.
 - $\frac{4}{2}$ sq units
- (B)
- 1 sq unit (C) $\frac{2}{3}$ sq units (D) $\frac{1}{3}$ sq units
- The area of the region bounded by the ellipse $\frac{x^2}{25} + \frac{y^2}{14} = 1$ is: 50.
 - (A) $20\pi sq$ units
- (B)
- $20\pi^2$ sq units (C) $16\pi^2$ sq units
- (D) $25\pi sq$ units
- The area of the region bounded by the circle $x^2 + y^2 = 1$ is: 51.
 - (A) $2\pi sq$ units
- (B) π sq units
- (C) $3\pi sq$ units
- (D) 4π sq units
- The area of the region bounded by the curve y = x + 1 and the lines x = 2, x = 3, is: 52.
 - $\frac{7}{2}$ sq units (A)
- (B) $\frac{9}{3}$ sq units (C) $\frac{11}{3}$ sq units (D) $\frac{13}{3}$ sq units
- The area of the region bounded by the curve x = 2y + 3 and the lines y = 1, y = -1 is: 53.
 - (A) 4 sq units
- **(B)** $\frac{3}{2}$ sq units **(C)** 6 sq units
- (D) 8 sq units