Application of Integration

1.Sketch the graph of the equation $y = x^2 - 4$. Find the area bounded for each of the following

i. $y \le 5,\ x \ge 0$ and the graph

ii. $y \le 0,\ -2 \le x \le 2$ and the graph

iii.between the line $y = 3x - 4$ and the graph.

2.Find the area bounded by the curves $y = e^x$, $y = e^{-x}$ and between $x = -1$ and $x = 1$.

3.Find the area bounded by the graphs $y = x^2$ and $y = |x|$.

4. Find the area of the region of the xy - plane defined by the inequalities $y \le x(1-x)$ and $y \ge x - 1$.

5.Find the volume generated when the area between $y = e^x$ the x-axis , y-axis and $x = 1$ is rotated one revolution about the x-axis.

6.The area defined by the inequalities $y \ge x^2 + 1,\ x \ge 0,\ y \le 2$ is rotated completely about the y-axis.
Find the volume of the solid generated.

7.The area enclosed by the curve $y = 4x - x^2$ and the line $y = 3$ is rotated about the line $y = 3$.

Show that the volume of the solid generated is $\frac{16\pi}{15}$.

8.The area of the region defined by the inequalities $y^2 \le x, y \ge x$ is rotated about the x-axis.

Show that the volume of the solid generated is $\frac{\pi}{6}$ cubic units.

9.The area enclosed by $y = x^2$ and $y^2 = x$ is rotated about the x-axis is. Find the volume generated.

10.The area defined by the inequalities $o \le y \le x^2, o \le x \le 2$ is rotated about the y-axis .
Find the volume generated.

11.Find the volume generated when the area in the first quadrant enclosed by $y = |x^2 - 1|$ and the line $y = 1$ is rotated about the line $y = 1$.

12.Find the area enclosed of the region given by $\{(x, y); x^2 + 2 \le y \le |3x|\}$

13.Find the area bounded by the parabola $y^2 = 4ax$ its axis and the two lines $x = a$ and $x = 2a$.

14.Find the area bounded by the parabola $y^2 = 4ax$; $a > 0$ and the line $x = a$.

15.Find the area bounded by the curve $x^2 = 16y$ and the lines $y = 1,\ y = 4$.

16.Find the area bounded by the parabola $y = 4 - x^2$ and $x - axis$.

17.Find the area bounded by the curve $y^2 = 4ax$ and the line $y = 2a$ and $y - axis$.

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

19.Make a rough sketch of the curve $y = \sin x \quad 0 \le x \le 2\pi$ and evaluate the area.

20.Sketch the graph of $y = |x - 5|$. find the area bounded by $x = 0$ and $x = 1$.

21.Sketch the graph of $y = |x + 1|$ and find the area enclosed by this curve, $x = -3 \quad x = 1$ and $x - axis$.

22.Using integration find the area of the region bounded by the curves $y = |x + 1| + 1,\ x = -3, x = 3$ and $y = 0$.

23.Draw a rough sketch and find the area of the region bounded by two parabolas $y^2 = 8x$ and $x^2 = 8y$ by using method of integration.

24. Find the area of the smaller region bounded by the ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ and the straight line $\frac{x}{a} + \frac{y}{b} = 1$.

25.Using integration find the area of the triangular region whose sides have the equations $y = 2x + 1,\ y = 3x + 1$ and $x = 4$.

26.Find the area bounded by the curve $x^2 = 4y$ and the straight line $x = 4y - 2$.

27.Find the area of the region bounded by the curves $y = x^2 + 2,\ y = x,\ x = 0$ and $x = 3$.

28.Find the area of the region enclosed between two circles $x^2 + y^2 = 1$ and $(x-1)^2 + y^2 = 1$.

29. Sketch the region common to the circle $x^2 + y^2 = 16$ and theparabola $x^2 = 6y$. Also find the area of the region using integration.

30.Sketch the region bounded by the curves $y = \sqrt{5 - x^2}$ and $y = |x - 1|$ and find its area.

31.Find the area of the region. $\{(x, y);\ x^2 \le y \le x\}$

32.Find the area of the region $\{(x, y);\ x^2 \le y \le |x|\}$

33.Draw a rough sketch of the region $\{(x, y);\ y^2 \le 4x,\ 4x^2 + 4y^2 \le 9\}$ and find the area enclosed by the region using method of integration.

34.Find the area of the region $\{(x, y);\ x^2 + y^2 \le 2ax,\ y^2 \le ax,\ x \ge 0,\ y \ge 0\}$

35.Find the area of the region $\{(x, y);\ x^2 + y^2 \le 1 \le x + y\}$

36. Find the volume of a sphere.

37. Find the volume of the solid of revolution obtained by revolving the plane region *R* bounded by $y = \sqrt{x}$, the *x*- axis and the line $x = 4$ about the *x*-axis