

Chapter 11

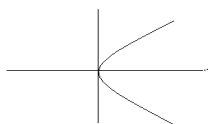
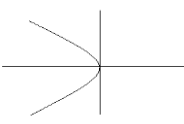
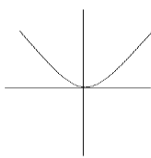
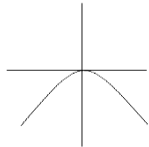
CONIC SECTION

CIRCLE:

The equation of a circle with centre at (h, k) and radius r is $(x - h)^2 + (y - k)^2 = r^2$

Equation of a circle with centre at origin and radius r is $x^2 + y^2 = r^2$

PARABOLA(Symmetric about its axis)

| | Right | Left | Upward | Downward |
|--------------|--|--|---|--|
| Equation | $y^2 = 4ax$ | $y^2 = -4ax$ | $x^2 = 4ay$ | $x^2 = -4ay$ |
| Axis | $y = 0$ | $y = 0$ | $x = 0$ | $x = 0$ |
| Figure |  |  |  |  |
| Focus | $(a, 0)$ | $(-a, 0)$ | $(0, a)$ | $(0, -a)$ |
| Vertex | $(0,0)$ | $(0,0)$ | $(0,0)$ | $(0,0)$ |
| Latus Rectum | $4a$ | $4a$ | $4a$ | $4a$ |
| Directrix | $x = -a$ | $x = a$ | $y = -a$ | $y = a$ |

ELLIPSE (Symmetric about both the axis)

| | | |
|----------------------------|---|---|
| Equation | $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ | $\frac{x^2}{b^2} + \frac{y^2}{a^2} = 1$ |
| Equation of the major axis | $y=0$ | $x=0$ |
| Length of major axis | $2a$ | $2a$ |
| Length of minor axis | $2b$ | $2b$ |
| Vertices | $(\pm a, 0)$ | $(0, \pm a)$ |
| Foci | $(\pm c, 0)$ | $(0, \pm c)$ |
| Eccentricity | $e = \frac{c}{a}$ | $e = \frac{c}{a}$ |
| Latus Rectum | $\frac{2b^2}{a}$ | $\frac{2b^2}{a}$ |

HYPERBOLA

| Equation | $\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$ | $\frac{y^2}{a^2} - \frac{x^2}{b^2} = 1$ |
|---------------------------------|---|---|
| Equation of the transverse axis | y = 0 | x = 0 |
| Length of transverse axis | 2a | 2a |
| Length of conjugate axis | 2b | 2b |
| Vertices | (± a, 0) | (0, ± a) |
| Foci | (± c, 0) | (0, ± c) |
| Eccentricity | $e = \frac{c}{a}$ | $e = \frac{c}{a}$ |
| Latus Rectum | $\frac{2b^2}{a}$ | $\frac{2b^2}{a}$ |

TEXT BOOK QUESTIONS

- * → Exercise 11.1 → Qns 10,11
- * → Exercise 11.2 → Qns 5,6,8
- * → Exercise 11.3 → Qns 5,6,7,8,9,10
- * → Exercise 11.4 → Qns 4,5,6
- * → Example → 4,17,18,19
- ** → Exercise 11.1 → Qns 9,12,13,14
- ** → Exercise 11.2 → Qns 11,12
- ** → Exercise 11.3 → Qns 13 to Qns 20
- ** → Exercise 11.4 → Qns 10 to Qns 15

Extra Questions:

- Find the centre and the radius of $3x^2 + 3y^2 + 6x - 4y - 1 = 0$
(ans : (-1, 2/3), 4/3)
- Find the value of p so that $x^2 + y^2 + 8x + 10y + p = 0$, is the equation of the circle of radius 7 units.
(ans : -8)
- Find the equation of the circle when the end points of the diameter are
A (-2, 3), B (3, -5) (ans: $x^2 + y^2 - x + 2y - 21 = 0$)

4. Find the equation of the circle circumscribing the triangle formed by the straight lines: $x + y = 6$, $2x + y = 4$ and $x + 2y = 5$

$$(\text{ans: } x^2 + y^2 - 17x - 19y + 50 = 0)$$

5. Find the area of the triangle formed by the lines joining the vertex of the parabola $x^2 = 12y$ to the ends of its latus rectum. (ans : $\frac{1}{2} \times 12 \times 3$ sq.units)

6. Find the equation of the ellipse with eccentricity $\frac{3}{4}$, foci on y-axis, center at the origin and passes through the point (6, 4) (ans: $16x^2 + 7y^2 = 688$)

7. Find the length of major axis and minor axis of $4x^2 + y^2 = 100$

8. Find the equation of the parabola with the centre at origin, length of transverse axis 6 units and a focus at (0, 4). (ans: $7y^2 - 9x^2 = 63$)

9. The line $5x - y = 3$ is a tangent to a circle at a point (2, 7) and its centre is on the line $x + 2y = 19$. Find the equation of the circle (ans: $x^2 + y^2 - 14x - 12y + 59 = 0$)

10. Find equation of the circle which touches the y-axis at origin and whose radius is 3 units. (ans: $x^2 + y^2 - 6x = 0$)