SUBJECT- MATHEMATICS, CLASS-XI

CHAPTER-(CONIC SECTIONS)

WORKSHEET (HOTS)

1. If 'p' and 'q' be the longest distance and the shortest distance of the point (-7,2) from any point (α , β) on the curve whose equation is x²+y²-10x-14y-51=0, then find the Geometric mean of p and q.

2. Two rods of length 'a' and 'b' slide along the co-ordinate axes, which are rectangular, in such a way that their ends are always Concyclic ,then find the locus of the centre of the circle passing through these ends.

3. If on a given base, triangle be described such that the sum of the tangents of the base angle is constant(k). Then find the locus of the third vertex.

4. The Parabola $y^2 = \lambda x$ and $25[(x-3)^2+(y+2)^2] = (3x-4y-2)^2$ are equal, then find the value of λ .

5. The equation of Latus-rectum of a parabola is x+y-8=0 and the equation of the tangent at the vertex is x+y-12=0, then find the length of the latus rectum.

6. If a triangle is inscribed in an ellipse and two of its sides are parallel to given straight lines , then find the envelop of the third side.

7. A tangent to the ellipse $x^2+4y^2=4$ meets the ellipse $x^2+2y^2=6$ at P and Q. Find the angle at which the tangents at P and Q of the ellipse $x^2+2y^2=6$ are inclined.

8. If e and e' are the eccentricities of a hyperbola and its conjugate , then find the value of $\frac{1}{e^2}$ + $\frac{1}{e^{r^2}}$

9. If CF is the perpendicular from the centre 'C' of the ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ on the tangent at any point 'P' and G is the point when the normal at 'P' meets the major axis , then find CF.BG.

10. If the latus rectum of a hyperbola forms an equilateral triangle with the vertex at the centre of it, then what is the eccentricity of the hyperabola.

Multiple Choice Questions

11. A chord of the parabola $y=x^2-2x+5$ joins the point with the abscissas 1 and 3 Then the equation of the tangent to the parabola parallel to the chord is:

A.

$$2x - y - \frac{5}{4} = 0$$
B.

$$2x - y - 2 = 0$$
C.

$$2x - y - 1 = 0$$
D.

$$2x - y - 1 = 0$$

12. In the *XY*-plane, three distinct lines l_1, l_2, l_3 concur at point $(\lambda, 0)$. Further the lines l_1, l_2, l_3 are normals to the parabola $y^2 = 6x$ at the points $A = (x_1, y_1), B = (x_2, y_2), C = (x_3, y_3)$ respectively. Then we have

- A. A $\lambda < -5$
- B. $\lambda > 3$
- C. $-5 < \lambda < -3$
- D. $0 < \lambda < 3$

13. Let S be the focus of the parabola $y^2 = 8x$ and let PQ be the common chord of the circle $x^2 + y^2 - 2x - 4y = 0$ and the given parabola. The area of the triangle PQS is

- A. 2
- B. 4
- C. 6
- D. 8

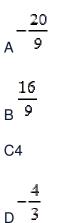
14. How many real tangents can be drawn from the point (4,3) to the hyperbola $x^2/16 - y^2/9 = 1$ and find angle between the tangents respectively.

A. 2, $\arctan\left(\frac{3}{4}\right)$ B. 2, $\arctan\left(\frac{4}{2}\right)$ C..1, $\arctan\left(\frac{4}{3}\right)$

D. 1, $\arctan\left(\frac{3}{4}\right)$

15. The tangent at an extremity (in the first quadrant) of latus rectum of the

 $\frac{x^2}{4} - \frac{y^2}{5} = 1$, meets x-axis and y-axis at A and B respectively. Then $(O4)^2 - (OB)^2$, where O is the origin, equals:



16. What type of conic would pass through the intersection of two rectangular hyperbolas?

- A. Ellipse
- B. Parabola
- C. Rectangular hyperbola
- D. Circle

17. Find the equation of a line that makes 90° with the ellipse $\frac{x^2}{64} + \frac{y^2}{36} = 1$ and the line perpendicular to this line at $(\sqrt{32}, \sqrt{18})$.

$$A_{1} \frac{x + \sqrt{32}}{36} + \frac{y + \sqrt{18}}{64} = 1, \sqrt{32}x - \sqrt{18}y = 14$$

$$B_{\rm B} = \frac{x \cdot \sqrt{32}}{64} + \frac{y \cdot \sqrt{18}}{36} = 1, \sqrt{32}x - \sqrt{18}y = \sqrt{14}$$

$$\sum_{v=1}^{v} \frac{x \cdot \sqrt{32}}{64} + \frac{v \cdot \sqrt{18}}{100} = 1, \sqrt{32}x - \sqrt{18}v = 7$$

$$\sum_{v=1}^{v} \frac{x \cdot \sqrt{32}}{64} + \frac{v \cdot \sqrt{18}}{36} = 1, \sqrt{32}x - \sqrt{18}v = 14$$

$$\frac{x^2}{15} + \frac{y^2}{10} = 1$$

18. If a perpendicular to major axis of 15 10 is drawn from (3,2), the perpendicular again cuts the ellipse at B. Find point of intersection of normal drawn from B with major axis.

- A. (3,0)
- B. (1,0)
- C. (0,1)
- D. (2,0)

19. A tangent of the ellipse $\frac{x^2}{25} + \frac{y^2}{16} = 1$ at any point P meet the line x = 0 at a point Q. Let R be the image of Q in the line y = x, then circle whose extremities of a diameter are Q and R passes through a fixed point. The fixed point is

- A. (3, 0)
- B. (5, 0)
- C .(0, 0)
- D. (4, 0)

20. A circle has the same centre as an ellipse & passes through the focii F1 & F2 of the ellipse, such that the two curves intersect in 4 points. Let 'P' be any one on their point of intersection. If the major axis the ellipse is 17 & the area of the triangle PF1 F2 is 30, then the distance between the foci is

- A. 11
- B. 12
- C. 13
- D. 15