CONIC SECTIONS- Parabola & Ellipse

1. Find the focus , vertex, length of latus rectum, equation of axis and equation of the directrix of the following:
   i) $y^2 = 8x$ ii) $y^2 = -x$ iii) $x^2 = -6y$ iv) $3x^2 = 8y$
   ans: iii) F(0, 2/3),   V(0, 0),   LL' = 8/3,   axis: x= 0,   directrix: y = -2/3

2. Find the coordinates of a point on the parabola $y^2 = 18x$ whose ordinate is three times the abscissa.   Ans:(2,6)

3. Find the coordinates of the foci, vertices, length of major axis, length of minor axis , eccentricity and length of latus rectum:
   i) $3x^2 + 2y^2 = 18$ ii) $x^2/169 + y^2/144 = 1$ iii) $x^2/100 + y^2/25 = 1$

4. Find the equation of the ellipse passing through the points (-3, 1) & (2, -2).
                                              Ans: $3x^2 + 5y^2 = 32$

5. In each of the following, find the equation of the ellipse satisfying the given conditions:
   i) F(± 2, 0); e = ½   ii) F(±3, 0) & passing through (4, 1)   iii) F(0, ±5); V(0, ±13)
   iv) F(0, ±4) & length of major axis is 12   v) LL' = 5 & e = 2/3

   <u>ans:</u> i) $x^2/36 + y^2/32 = 1$ ii) $x^2 + 2y^2 = 18$ iii) $x^2/144 + y^2/169 = 1$
   iv) $x^2/36 + y^2/20 = 1$ v) $4x^2/81 + 4y^2/45 = 1$

CONIC SECTIONS- Hyperbola

1. Find the coordinates of the foci, vertices, length of major axis, length of minor axis , eccentricity and length of latus rectum(LL'):
   i) $x^2/9 - y^2/4 = 1$ ii) $2x^2 - 3y^2 = 5$ iii) $y^2/5 - x^2/16 = 1$

2. Find the equation of the hyperbola for the following cases:
   i) e = √2 & distance between foci = 16   ii) LL' = 8 & e = 3/√5   iii) V(0, ±6) & e = 3/2

   iv) V(±4, 0) & F(±6,0)   v) F(0, ±√13), passing through (3,2)   vi) F(±12, 0) and LL' = 36

   ans: i) $x^2 - y^2 = 32$ ii) $4x^2 - 5y^2 = 100$ iii) $5y^2 - 4x^2 = 180$ iv) $5x^2 - 4y^2 = 80$
   v) $y^2/9 - x^2/4 = 1$ vi) $3x^2 - y^2 = 108$