Mathematics for Science

Assignment 4

Ellipses and Hyperbolas

Lecturer: Kahenya, N.P

Instructions: Attempt all the Questions

1. Outline areas where ellipses and hyperbolas are applied.
2. Given the following equations of ellipses, determine their centres, foci, covertices, and vertices
   a) $25x^2 + 16y^2 = 400$
   b) $25x^2 - 100x + 36y^2 + 216y - 476 = 0$
   c) $16x^2 + 32x + 9y^2 - 36y - 92 = 0$
   d) $4y^2 + 16y + 9x^2 + 54x + 61 = 0$
3. Find the vertices, covertices, and the foci of the following ellipses
   a) $\frac{x^2}{9} + \frac{y^2}{16} = 1$
   b) $\frac{x^2}{28} + \frac{y^2}{30} = 1$
   c) $14x^2 + 36y^2 = 252$
   d) $4x^2 + 9y^2 - 36 = 0$
4. Find the centre, vertices, eccentricity, foci, and asymptote of the following hyperbolas
   a) $\frac{x^2}{36} - \frac{y^2}{49} = 1$
   b) $3x^2 - 7y^2 - 21 = 0$
   c) $\frac{1}{16}x^2 - \frac{1}{25}y^2 - \frac{1}{4}x + \frac{6}{25}y - 1.11 = 0$
   d) $\frac{(x-2)^2}{49} - \frac{(y+3)^2}{121} = 1$