Practice Sheet # 9

MAT110
Mathematics I

Pair of straight lines

1. Show that the following equations represents a pair of straight lines; find also their point of intersection and the angle between them:

   (i) $2y^2 - xy - x^2 + y + 2x - 1 = 0$, (ii) $2x^2 - 2xy + x + 2y - 3 = 0$,

   (iii) $x^2 + 3xy + 2y^2 + \frac{1}{8}x - \frac{1}{32} = 0$, (iv) $21x^2 + 40xy - 21y^2 + 44x + 122y - 17 = 0$.

2. Find the value of λ or k so that the following equations may represent pairs of straight lines:

   (i) $2\lambda xy - y^2 + 4x + 2y + 8 = 0$, (ii) $2x^2 + xy - y^2 - 2x - 5y + k = 0$

   (iii) $x^2 - \lambda xy + 2y^2 + 3x - 5y + 2 = 0$, (iv) $12x^2 - 10xy + 2y^2 + 11x - 5y + \lambda = 0$.

3. Find the equations of the bisectors of the angles between the following pairs of straight lines:

   (i) $x^2 + xy - 6y^2 - x - 8y - 2 = 0$, (ii) $8x^2 - 14xy + 6y^2 + 2x - y - 1 = 0$,

   (iii) $2x^2 + xy - y^2 - 3x + 6y - 9 = 0$, (iv) $2x^2 + 7xy + 6y^2 + 13x + 22y + 20 = 0$

Circle

1. Find the equation of the circle with

   (i) centre (-2, -1) and radius 4, (ii) centre (9, 0) and radius 1,

   (iii) centre (0, 0) and radius 5.

2. Find the centre and radius of the following circles:

   (i) $5x^2 + 5y^2 - 11x - 9y - 12 = 0$, (ii) $x^2 + y^2 + 2x + 2y + 1 = 0$

   (iii) $x^2 + y^2 + 2x - 4y - 8 = 0$.

3. Find the equation of the circle passing through the points:

   (i) $(1, 3), (2, -1), (-1, 1)$, (ii) $(-4, -3), (-1, -7), (0, 0)$, (iii) $(3, 1), (4, -3), (1, -1)$.