Problem Sheet 1

1. Specify the solution set of:

a) $-2 \le x < 3$ b) $0 < |x-2| < 1$

2. Specify the solution set of:

a) $|4x-1| \ge 1$ b) $|2+1/x| > 1$

3. Specify the solution set of:

a) $(x-1)^2(x+4) > 0$ b) $(3x-1)(2x+3) > 0$

4. Specify the solution set of:

a) $x^2 + 6x + 8 \le 0$ b) $6x^2 + 13x < 5$

5. Specify the solution set of:

a) $\dfrac{2x-1}{x} < 3$ b) $\left|\dfrac{2x-1}{x}\right| < 3$

6. Find a simple equation relating x and y for the line through

a) (3,6) & (2,4) b) (8,5) & (4,0)

7. Find a simple equation relating x and y for the line

a) through (3,-4) and parallel to the line with equation $5x - 2y = 4$

b) through (-2,5) and perpendicular to the line with equation $4x + 8y = 3$

8.

a) Are (8,0), (-1,-2), (-2,3) and (7,5) the vertices of a parallelogram?

b) What k makes (7,3), (-1,0) and (k,-2) the vertices of a right-angled triangle?

9. Given the triangle with vertices A=(0,0), B=(2,0) and C=(3,3) give equations for

a) the median through B

b) the perpendicular bisector of BC

10. Give equations for the circles:

a) centre at (3,5) and radius 2

b) centre at (-2,3) passing through (3,-2)

11. Find the equation of circles through

a) (2,3), (-6,-3) and (1,4)

b) (-2,1), (1,4) and (-3,2)

12.

a) What k makes $x^2 + y^2 4x - 6y + k = 0$ describe a circle?

b) find the circle passing through $\left(1, 3+\sqrt{2}\right)$ and tangent to $x + y = 2$ at (2,0)