Section 2: Circles

Exercise level 2

1. (i) Show that the line $y = 4 - x$ is a tangent to the circle $x^2 + y^2 = 8$.
   (ii) Show that the line $4y = 3x - 25$ is a tangent to the circle $x^2 + y^2 = 25$.

2. A circle passes through the points Q(0, 3) and R(0, 9) and touches the *x*-axis.
   Work out two possible equations for the circle.

3. The line $2y + x = 10$ meets the circle $x^2 + y^2 = 65$ at P and Q.
   Calculate the length of PQ.

4. The line $y = x + 1$ does not intersect the circle $(x-1)^2 + (y+2)^2 = k$.
   Find the possible values for *k*.

5. The points P (-2, 6), Q (6, 0) and R (5, 7) all lie on a circle.
   (i) Show that PR is perpendicular to QR.
   (ii) Explain why the result from (i) shows that PQ is a diameter of the circle.
   (iii) Hence calculate the equation of the circle.

6. (i) Write down the equation of the circle centre (0, 0) and radius $\sqrt{17}$.
   (ii) Show that the point P(-4, -1) lies on the circle.
   (iii) Find the equation of the tangent at P.
   (iv) The line $x + y = 3$ meets the circle at two points, Q and R.
   Find the coordinates of Q and R.
   (v) Find the coordinates of the point, S, where the tangent at P intersects the line $x + y = 3$.