Specialist Maths (Year 12)
(Conics and Functions)
Practice Test#2

Please Note: Use calculator wherever necessary   Marks: Time: 3600 sec

1. Find the equation of the circle passing through the points P (3,-1), Q (6, 2) and R (5, 3).

2. Find the equation of the locus of a point that moves such that its distance from the line **x = - 6** equals its distance from the point P (1, 3).

3. Find the equation of a hyperbola if the line **y + 3 = x** is a normal at Q (2,-1).

4. Find the equation of an ellipse if Foci (0, ± 6), length of minor axis = 16 and centre is at the origin.

5. Given that the equation of an ellipse is $y^2 + 4x^2 + dx + ey + f = 0$. Find the values of the constants d, e, ad f that make the ellipse tangent to the x-axis at the origin and pass through the point (-1, 2)?

6. Show that the equation of the tangents with gradient *m* for a parabola $y^2 = 4ax$ is **y = mx + a/m**; where m ≠ 0.

7. Find the polar equation of the circle whose radius is 4 and whose centre is at the point C (2, π/3).

8. Find the equation of the conic with *e*=1.75 and directrix 5 units to the right of the pole.

9. Given $xy=c^2$ is the equation of a rectangular hyperbola. The point **M (cq, c/q)** is any point on the rectangular hyperbola. Point L is the foot of the perpendicular from M on the x-axis. The tangent at M cuts the y-axis at W. The line through W that is parallel to the x-axis cuts the hyperbola at Q. Show that LQ is a tangent to the hyperbola.

10. Show that if **y = mx + c** is a tangent to the ellipse $x^2/a^2 + y^2/b^2 = 1$, then $m^2a^2 + b^2 = c^2$.

****