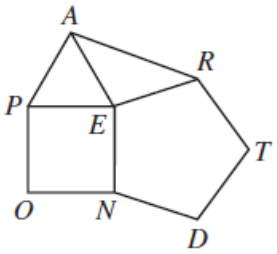
PENGAYAAN MATEMATIKA
SOAL-SOAL GEOMETRI 7

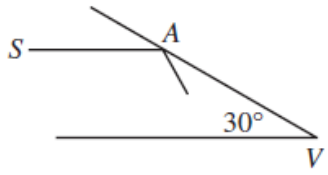
1. COMC, 2002

A regular pentagon is a five-sided figure which has all of its angles equal and all of its side lengths equal. In the diagram, *TREND* is a regular pentagon, *PEA* is an equilateral triangle, and *OPEN* is a square. Determine the size of $\angle EAR$.



2. COMC, 2002

Two mirrors meet at an angle of 30° at the point V. A beam of light, from a source S, travels parallel to one mirror and strikes the other mirror at point A, as shown. After a number of reflections, the beam comes back to S. If SA and AV are both 1 metre in length, determine the total distance travelled by the beam.



3. COMC, 2002

Square $ABCD$ has vertices $A(0,0)$, $B(0,8)$, $C(8,8)$, and $D(8,0)$. The points $P(0,5)$ and $Q(0,3)$ are on side AB, and the point $F(8,1)$ is on side CD.

(a) What is the equation of the line through Q parallel to the line through P and F?

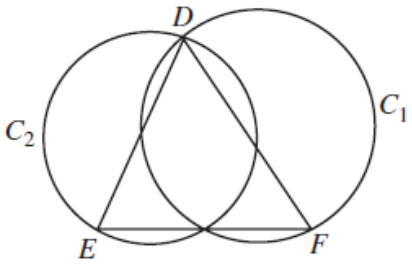
(b) If the line from part (a) intersects AD at the point G, what is the equation of the line through F and G?

(c) The centre of the square is the point $H(4,4)$. Determine the equation of the line through H perpendicular to FG.

(d) A circle is drawn with centre H that is tangent to the four sides of the square. Does this circle intersect the line through F and G? Justify your answer. (A sketch is *not* sufficient justification.)

4. COMC, 2002

Triangle DEF is acute. Circle C_1 is drawn with DF as its diameter and circle C_2 is drawn with DE as its diameter. Points Y and Z are on DF and DE respectively so that EY and FZ are altitudes of ΔDEF. EY intersects C_1 at P, and FZ intersects C_2 at Q. EY extended intersects C_1 at R, and FZ extended intersects C_2 at S. Prove that P, Q, R, and S are concyclic points.



5. COMC, 2003

The point $(4,-2)$ is reflected in the x-axis. The resulting point is then reflected in the line with equation $y = x$. What are the coordinates of the final point?