

Chapter 3 / Example 4

Voronoi diagrams

In questions about Voronoi diagrams, a GDC may be used to solve simultaneous equations.

A town has four coffee shops, A, B, C and D. An entrepreneur wishes to open a new shop in the town but would like it to be as far as possible from all the other four coffee shops. Consider the Voronoi diagram showing the positions of the 4 coffee shops on a set of coordinate axes. A(1, 6), B(2, 2), C(8, 2) D(8, 5) where one unit represents 1 km.

- Find the coordinates of the vertices P and Q in the Voronoi diagram.
- Determine the best position for the new shop so as to be as far as possible from any other shop.

The perpendicular bisector of [AD] is $7x - y = 26$

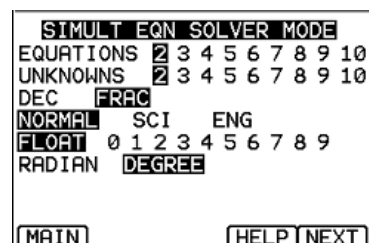
The perpendicular bisector of [BD] is $2x + y = 13.5$

To find the point of intersection solve the simultaneous equations press **[APPS]** :PlySmlt2

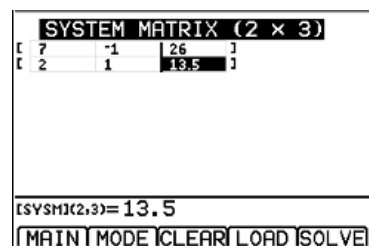
Press **[ENTER]** and select 2:SIMULTANEOUS EQN SOLVER

You are solving 2 equations with 2 unknowns

Press **[F5]** NEXT.



Enter to coefficients into the matrix.



Press **[F5]** SOLVE.

Press **[F5]** F ◀ ▶ D.

The calculator displays the solution $x = 4.39, y = 4.72$

The coordinates of Q are (4.39, 4.72).

