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2.4 COORDINATE GEOMETRY AS 90287

Use coordinate geometry methods

2.4 1. Use coordinate geometry methods A

- finding the mid-point between two points
- finding the distance between two points
- finding the equation of a line
- finding the equation of parallel or perpendicular lines
- finding coordinates of the point of intersection of two lines

► Calculate the midpoint of the line joining the points (4,5) and (6,-1).

► Find the distance between the points (-2, 3) and (5, 4).

► Find the equation of the line joining the points (4,5) and (6,-1)

► Find the coordinates of the point of intersection of the line $y = x - 5$ and the line $2x + 3y = 65$.

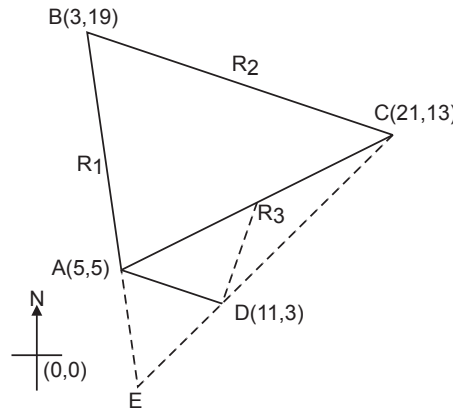
► Find the equation of the line that is perpendicular to the line $y = 2x - 3$ and that passes through the point (6,-1).

► Find the equation of the line that is parallel to the line $y = \frac{2}{3}x + 1$ and passes through the point (2, 5).

The Telephone Company is to lay a network of cables that link four towns, Awaiti, Berwick, Camden and Dashwood.

To help with the planning, a grid has been set up on a map with the origin at (0,0) and the towns indicated by the letters A (Awaiti), B (Berwick), C (Camden) and D (Dashwood).

Repeater units are to be installed at halfway points on three of the cables indicated by R_1 , R_2 and R_3 . The town of Dashwood is to be connected by a single cable to the town of Awaiti. Every unit represents one kilometre.



The diagram is not drawn to scale. Show working.

- The repeater unit R_1 is located at the midpoint between the towns A (5, 5) and B (3, 19). Find the coordinates of R_1 .
- Find the equation of the line joining the towns A (5, 5) and C (21, 13).
- The equation of the line AB is $y = -7x + 40$. Find the equation of the line parallel to AB and passing through the point D (11, 3).

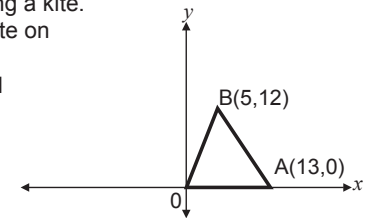
2.4 2. Solve problems involving coordinate geometry methods M

- finding the equation of medians, perpendicular bisectors and altitudes
- proving a triangle is isosceles or right angled isosceles
- proving points are collinear

► Prove that the points A (-7,-4), B (5, 2) and C (7, 3) are collinear. Plotting points is NOT sufficient.

► The line $5x + 3y = 7$ is perpendicular to the line $4x + ky = 9$, where k is a constant. Find the value of k .

- Karl and Grant are making a kite. They start drawing the kite on squared paper using the points O(0,0) A(13,0) and B(5,12) as three of the kite's vertices.



Show that OAB is an isosceles triangle.

- Karl and Grant do not know where to put the fourth vertex, but they know it is on the line through O perpendicular to AB.

Find the equation of this line.

2.4 3. Solve extended problems E

- problems require an extended chain of reasoning
- problems could be set in 3-dimensional situations
- problems could involve a proof

► The medians of a triangle intersect at a point called the centroid. Find the coordinates of the centroid, C, of the triangle PQR where the vertices of the triangle are P (-5,4), Q (2,5) and R (-6,9).