90287

Level 2 Mathematics, 2004

90287 Solve problems using a coordinate geometry method

Credits: Two
2.00 pm Tuesday 23 November 2004

Check that the National Student Number (NSN) on your admission slip is the same as the number at the top of this page.

Make sure you have a copy of Formulae Sheet L2–MATHF.

You should answer ALL the questions in this booklet.

Show ALL working.

If you need more space for any answer, use the page provided at the back of this booklet and clearly number the question.

Check that this booklet has pages 2–8 in the correct order and that none of these pages is blank.

YOU MUST HAND THIS BOOKLET TO THE SUPERVISOR AT THE END OF THE EXAMINATION.

Achievement Criteria	*For Assessor's use only*	
Achievement	**Achievement with Merit**	**Achievement with Excellence**
Solve problems using a coordinate geometry method.	Solve problems involving a combination of at least two coordinate geometry methods.	Choose and apply a variety of coordinate geometry methods to solve problems.
Overall Level of Performance		

You are advised to spend 25 minutes answering the questions in this booklet.

THE TELEPHONE COMPANY

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.

B (3,19)

R_2

C (21,13)

R_1

R_3

A (5,5)

N

(0,0)

D (11,3)

E
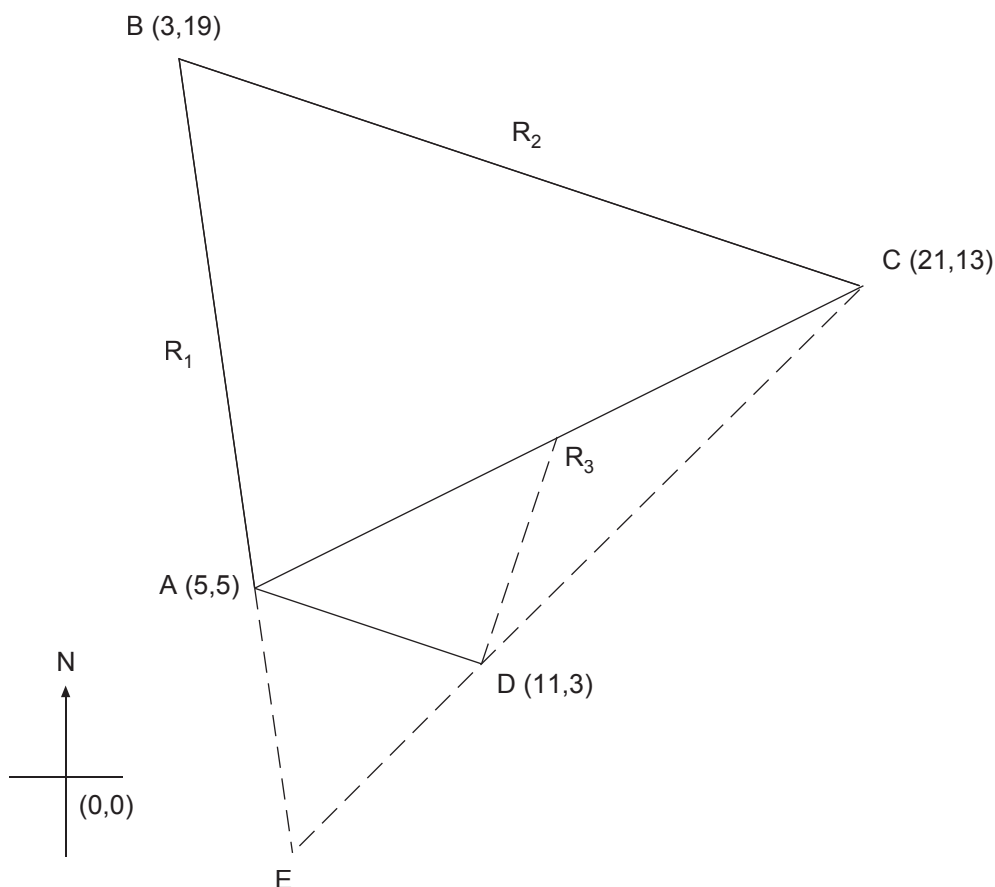
The diagram is **not** drawn to scale.

Show working.

QUESTION ONE

(a) 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.

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(b) Find the equation of the line joining the towns A (5,5) and C (21,13).

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(c) 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).

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QUESTION TWO

The town of Dashwood at D (11,3) is to be linked by an overhead cable to the repeater unit R_3 halfway between A (5,5) and C (21,13).

Find the length of this cable.

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The diagram is **not** drawn to scale.

QUESTION THREE

A survey point is to be set up at E where the extensions of the two lines AB and CD intersect.

The equation of AB is $7x + y - 40 = 0$ and the equation of CD is $y = x - 8$.

Find the equation of the line through E that is perpendicular to the line CD.

B (3,19)

R$_2$

C (21,13)

R$_1$

R$_3$

A (5,5)

N

D (11,3)

(0,0)

E

The diagram is **not** drawn to scale.

QUESTION FOUR
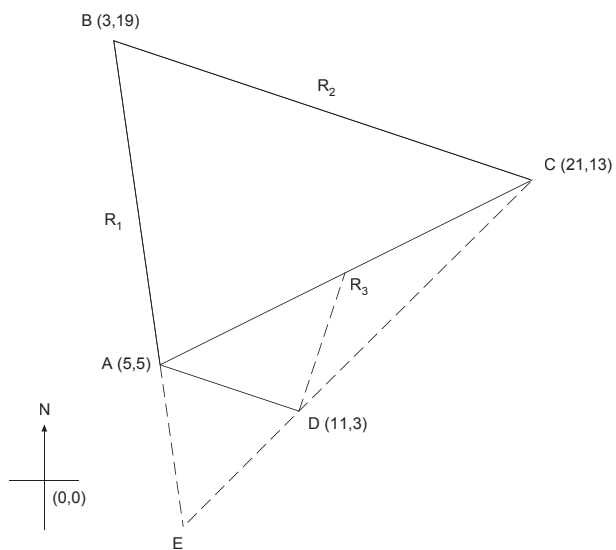
Show that the equation of the **altitude** of the triangle ABC that passes through the vertex B is $2x + y - 25 = 0$.

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B (3,19)

R_2

C (21,13)

R_1

R_3

A (5,5)

N

D (11,3)

(0,0)

E

The diagram is **not** drawn to scale.

QUESTION FIVE

An alternative plan is proposed to link the town of Dashwood at D (11,3) with a cable that is joined to the one linking the towns A (5,5) and C (21,13).

What would be the shortest distance between Dashwood and the line AC?

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Extra paper for continuation of answers if required.
Clearly number the question.

Question
number