Write your name here

Surname	Other names

Pearson Edexcel GCSE

Centre Number | | | | | |

Candidate Number | | | | |

Mathematics B

Unit 3: Number, Algebra, Geometry 2 (Calculator)

Higher Tier

Tuesday 17 June 2014 – Morning
Time: 1 hour 45 minutes

Paper Reference
5MB3H/01

You must have: Ruler graduated in centimetres and millimetres, protractor, pair of compasses, pen, HB pencil, eraser, calculator. Tracing paper may be used.

Total Marks

Instructions

- Use **black** ink or ball-point pen.
- **Fill in the boxes** at the top of this page with your name, centre number and candidate number.
- Answer **all** questions.
- Answer the questions in the spaces provided
  – *there may be more space than you need.*
- **Calculators may be used.**
- If your calculator does not have a π button, take the value of π to be 3.142 unless the question instructs otherwise.

Information

- The total mark for this paper is 80
- The marks for **each** question are shown in brackets
  – *use this as a guide as to how much time to spend on each question.*
- Questions labelled with an **asterisk** (*) are ones where the quality of your written communication will be assessed.

Advice

- Read each question carefully before you start to answer it.
- Keep an eye on the time.
- Try to answer every question.
- Check your answers if you have time at the end.

Turn over ▶

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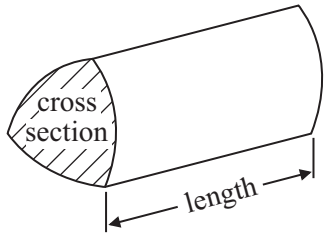
PEARSON

GCSE Mathematics 2MB01

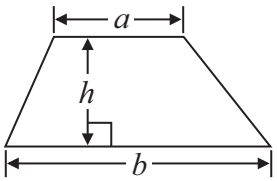
Formulae: Higher Tier

You must not write on this formulae page.
Anything you write on this formulae page will gain NO credit.

Volume of prism = area of cross section × length

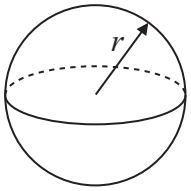


Area of trapezium = $\frac{1}{2}(a + b)h$



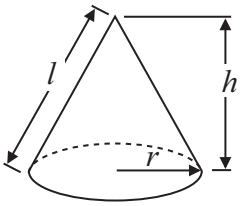
Volume of sphere = $\frac{4}{3}\pi r^3$

Surface area of sphere = $4\pi r^2$

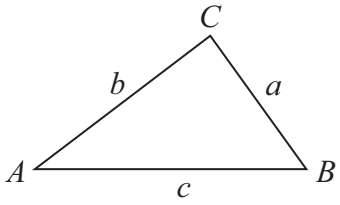


Volume of cone = $\frac{1}{3}\pi r^2 h$

Curved surface area of cone = πrl



In any triangle *ABC*



The Quadratic Equation
The solutions of $ax^2 + bx + c = 0$ where $a \neq 0$, are given by

$$x = \frac{-b \pm \sqrt{(b^2 - 4ac)}}{2a}$$

Sine Rule $\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$

Cosine Rule $a^2 = b^2 + c^2 - 2bc \cos A$

Area of triangle = $\frac{1}{2}ab \sin C$

Answer ALL questions.

Write your answers in the spaces provided.

You must write down all stages in your working.

1 Glen buys four tickets for a concert.
Each ticket costs £54

Glen also has to pay a booking fee.
The booking fee is 5% of the total price of the tickets.

Work out the total amount Glen has to pay.

£.....

(Total for Question 1 is 3 marks)

2 Tony has a hosepipe.
The length of the hosepipe is 20 m.

Tony stores the hosepipe on a reel.
The weight of the reel is 1.4 kg.

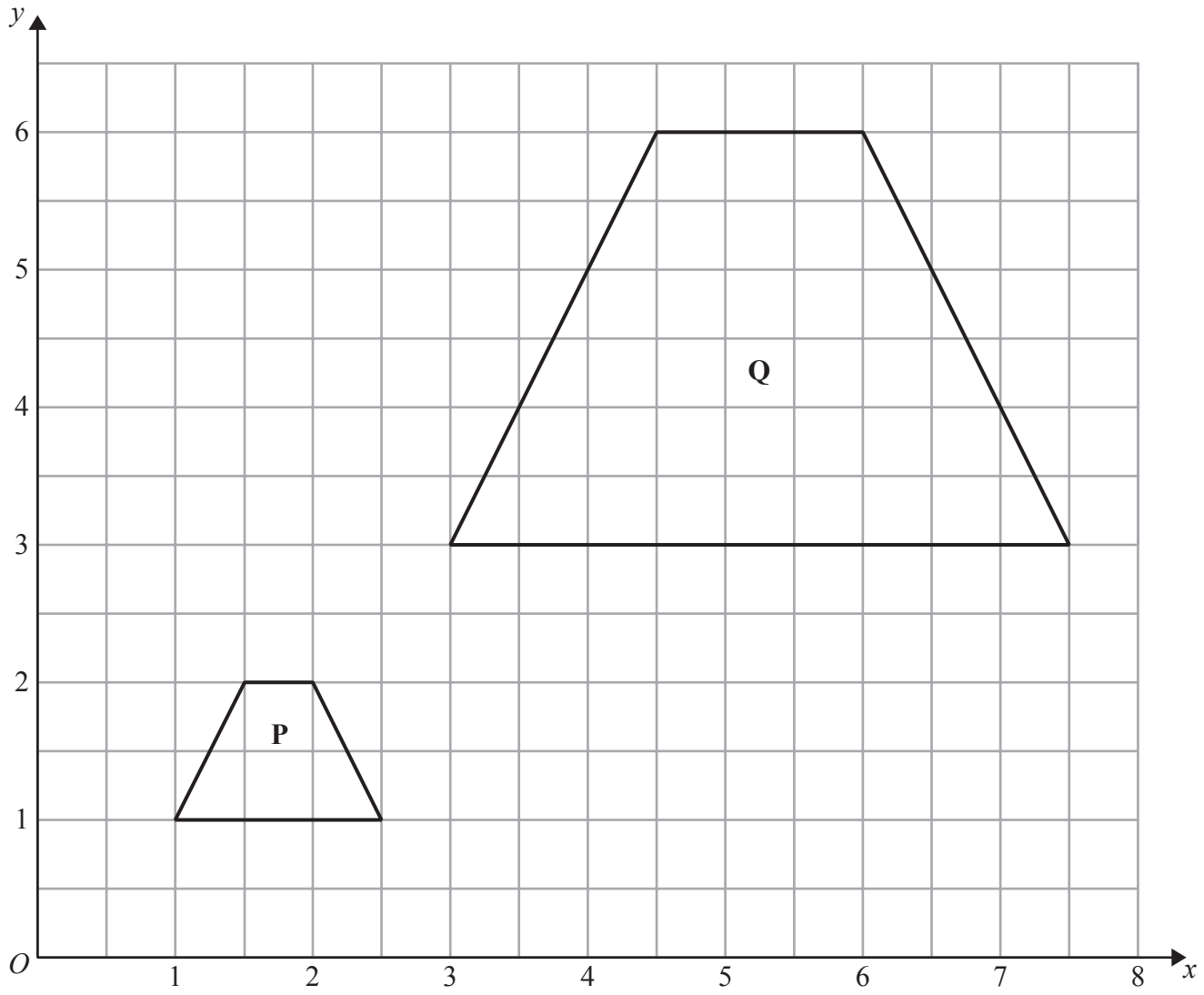
$\frac{1}{2}$ metre of the hosepipe has a weight of 150 grams.

Work out the total weight of the hosepipe and the reel.

..... kg

(Total for Question 2 is 3 marks)

3



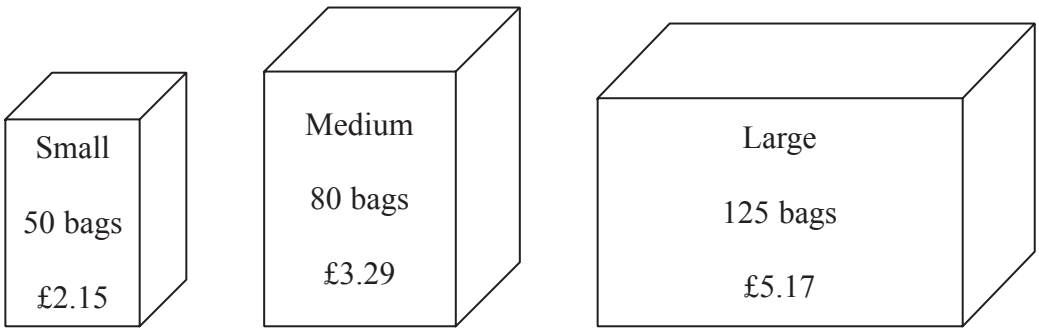
Describe fully the single transformation that maps shape **P** onto shape **Q**.

.....

.....

(Total for Question 3 is 3 marks)

***4** Tea bags are sold in three sizes of box.



A small box of 50 tea bags costs £2.15
A medium box of 80 tea bags costs £3.29
A large box of 125 tea bags costs £5.17

Which size of box is the best value for money?

(Total for Question 4 is 4 marks)

5 The diagram shows a tile.

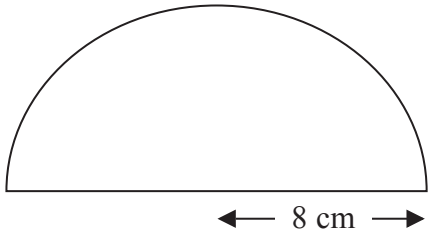


Diagram **NOT** accurately drawn

The tile is in the shape of a semicircle of radius 8 cm.

Work out the perimeter of the tile.
Give your answer correct to one decimal place.

..... cm

(Total for Question 5 is 3 marks)

6 Stephanie is x years old.
Tobi is twice as old as Stephanie.
Ulrika is 3 years younger than Tobi.

The sum of all their ages is 52 years.

(a) Show that $5x - 3 = 52$

(3)

(b) Work out the value of x.

$x =$ .....

(2)

(Total for Question 6 is 5 marks)

7 The diagram shows a container used to store oil.

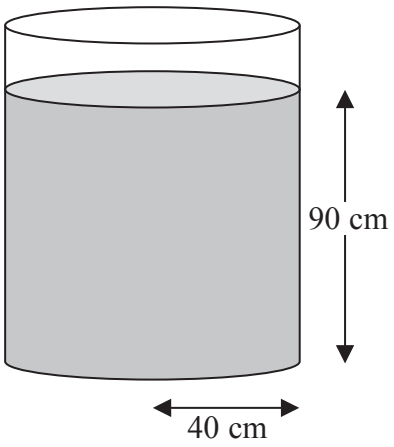


Diagram **NOT** accurately drawn

The container is in the shape of a cylinder of radius 40 cm.

The height of the oil in the container is 90 cm.

65 litres of oil are taken from the container.
1 litre = 1000 cm^3.

Work out the new height of the oil in the container.
Give your answer correct to one decimal place.

..... cm

(Total for Question 7 is 4 marks)

8 The equation

$$x^3 + 6x = 27$$

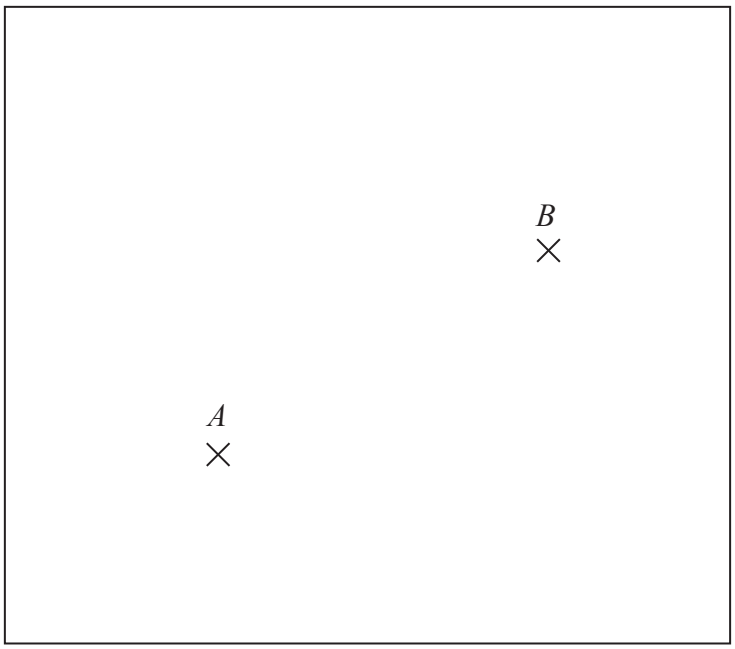
has a solution between 2 and 3

Use a trial and improvement method to find the solution.
Give your answer correct to one decimal place.
You **must** show all your working.

$x =$ .....

(Total for Question 8 is 4 marks)

9 The diagram shows the positions of two shops, A and B, on a map.



The scale of the map is 1 cm represents 5 km.

Yannis wants to build a warehouse.

The warehouse needs to be

less than 10 km from A,
less than 20 km from B.

Show by shading where Yannis can build the warehouse.

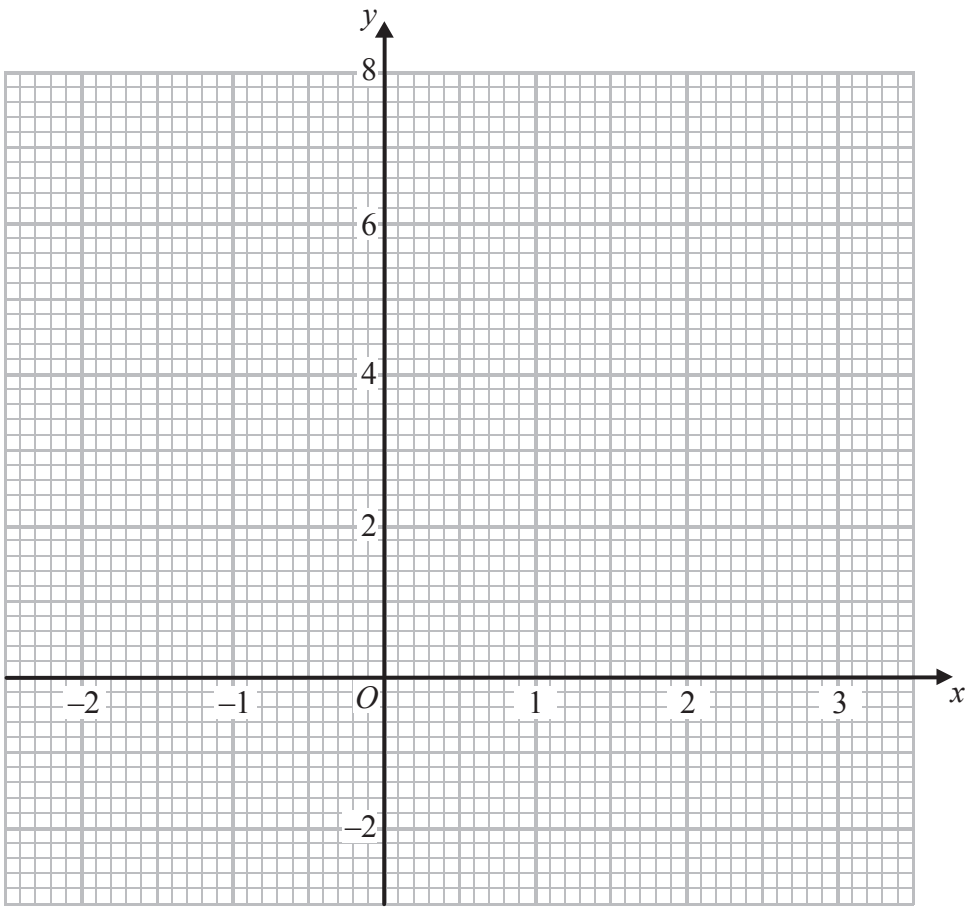
(Total for Question 9 is 3 marks)

10 (a) Complete the table of values for $y = x^2 - 2x - 1$

x	−2	−1	0	1	2	3
y	7			−2	−1	

(2)

(b) On the grid, draw the graph of $y = x^2 - 2x - 1$ for values of x from $x = -2$ to $x = 3$



(2)

(c) Find estimates for the solutions of the equation $x^2 - 2x - 1 = 0$

.....

(2)

(Total for Question 10 is 6 marks)

11

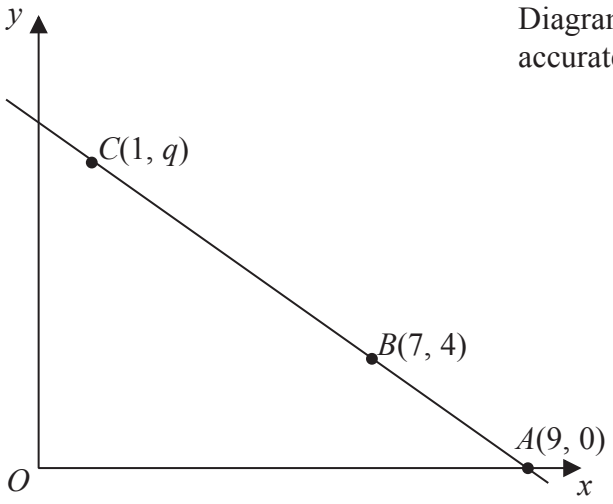


Diagram **NOT** accurately drawn

The points A, B and C lie on a straight line.

The coordinates of A are (9, 0).
The coordinates of B are (7, 4).
The coordinates of C are (1, q).

Work out the value of q.

.....

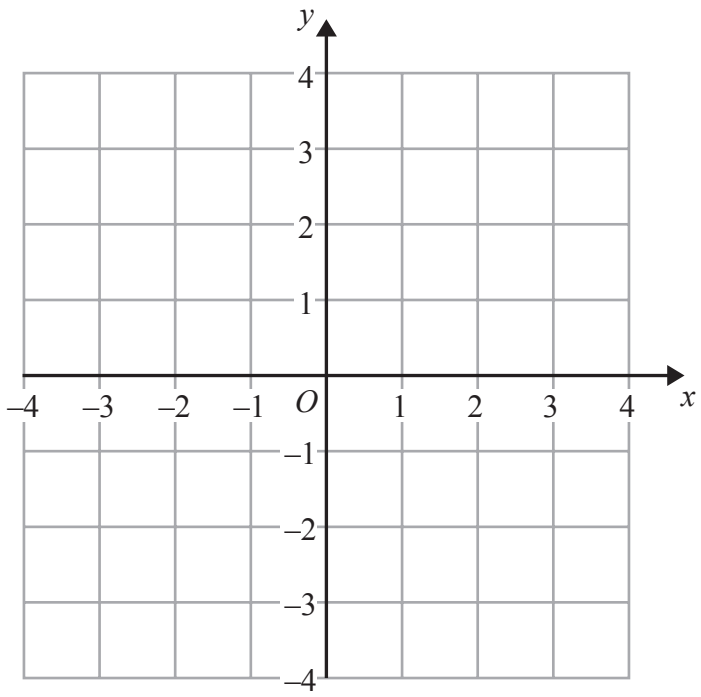
(Total for Question 11 is 3 marks)

12 (a) Solve the inequality $5e + 3 > e + 12$

.....

(2)

(b) On the grid, shade the region defined by the inequality $x + y > 1$



(2)

(Total for Question 12 is 4 marks)

13 The diagram shows the positions of a tower and a tree.

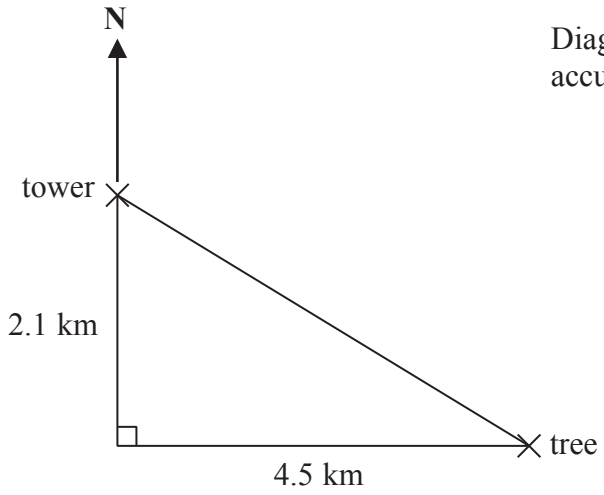


Diagram **NOT** accurately drawn

The tree is 2.1 km South of the tower and 4.5 km East of the tower.

(a) Work out the distance between the tower and the tree.
Give your answer correct to one decimal place.

..... km

(3)

(b) Work out the bearing of the tree from the tower.
Give your answer correct to the nearest degree.

.....°

(4)

(Total for Question 13 is 7 marks)

14 The value of a car depreciates by 25% each year.

At the end of 2013 the value of the car was £4800

Work out the value of the car at the end of 2015

£ .....

(Total for Question 14 is 3 marks)

15 D is directly proportional to x.

$D = 36$ when $x = 5$

Work out the value of D when $x = 8$

$D =$ .....

(Total for Question 15 is 2 marks)

16 (a) Write 4.5×10^{-3} as an ordinary number.

.....

(1)

(b) Work out the value of $(2.5 \times 10^{-2}) \div (3.8 \times 10^{3})$
Give your answer in standard form correct to 3 significant figures.

.....

(2)

(Total for Question 16 is 3 marks)

***17** Paper clips are sold in small boxes and in large boxes.

There is a total of 1115 paper clips in 4 small boxes and 5 large boxes.

There is a total of 530 paper clips in 3 small boxes and 2 large boxes.

Work out the number of paper clips in each small box and in each large box.

(Total for Question 17 is 5 marks)

***18** The diagram shows a solid wooden sphere.

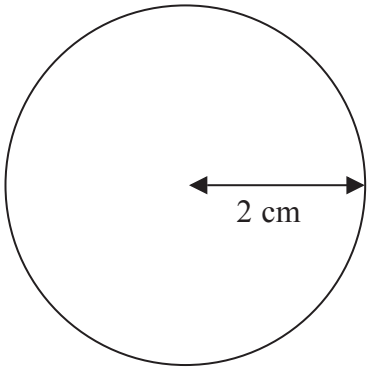


Diagram **NOT** accurately drawn

The radius of the sphere is 2 cm.
The mass of the sphere is 45 grams.

Wood will float on the Dead Sea only when the density of the wood is less than 1.24 g/cm^3.

Will this wooden sphere float on the Dead Sea?

(Total for Question 18 is 4 marks)

19

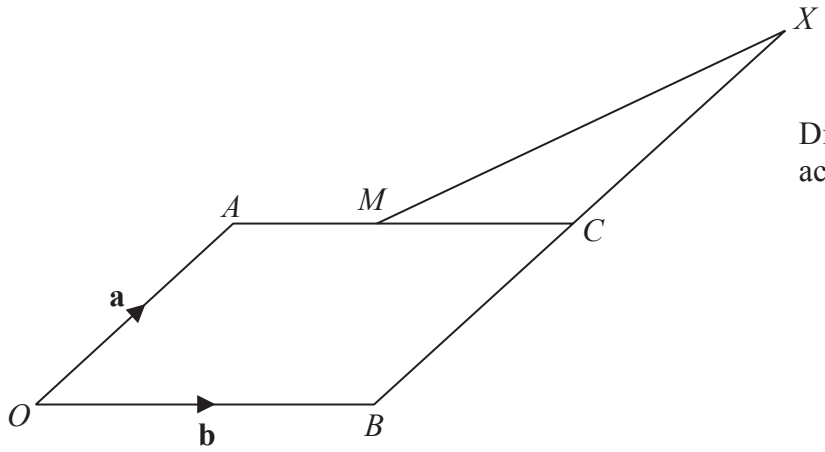


Diagram **NOT** accurately drawn

OACB is a parallelogram.

M is the midpoint of *AC*.
C is the midpoint of the straight line *BCX*.

$\overrightarrow{OA} = \mathbf{a}$ $\overrightarrow{OB} = \mathbf{b}$

Prove that *OMX* is a straight line.

(Total for Question 19 is 4 marks)

20 Jerry wants to cover a triangular field, ABC, with fertiliser.

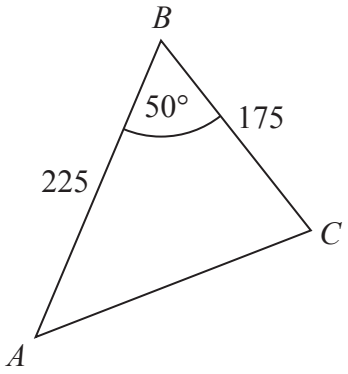


Diagram **NOT** accurately drawn

Here are the measurements Jerry makes

angle $ABC = 50^\circ$ correct to the nearest degree,
$BA = 225$ m correct to the nearest 5 m,
$BC = 175$ m correct to the nearest 5 m.

Work out the upper bound for the area of the field.
You must show your working.

..... m^2

(Total for Question 20 is 3 marks)

21 Solve $\frac{4-2x}{x+1} = x$

.....

(Total for Question 21 is 4 marks)

TOTAL FOR PAPER IS 80 MARKS

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