Cambridge IGCSE

Cambridge International Examinations
Cambridge International General Certificate of Secondary Education

CANDIDATE NAME									
CENTRE NUMBER						CANDIDATE NUMBER			

MATHEMATICS **0580/32**

Paper 3 (Core) **February/March 2016**

2 hours

Candidates answer on the Question Paper.

Additional Materials: Electronic calculator
Tracing paper (optional)
Geometrical instruments

READ THESE INSTRUCTIONS FIRST

Write your Centre number, candidate number and name on all the work you hand in.
Write in dark blue or black pen.
You may use an HB pencil for any diagrams or graphs.
Do not use staples, paper clips, glue or correction fluid.
DO **NOT** WRITE IN ANY BARCODES.

Answer **all** questions.
If working is needed for any question it must be shown below that question.
Electronic calculators should be used.
If the degree of accuracy is not specified in the question, and if the answer is not exact, give the answer to three significant figures. Give answers in degrees to one decimal place.
For π, use either your calculator value or 3.142.

At the end of the examination, fasten all your work securely together.
The number of marks is given in brackets [ ] at the end of each question or part question.
The total of the marks for this paper is 104.

The syllabus is approved for use in England, Wales and Northern Ireland as a Cambridge International Level 1/Level 2 Certificate.

This document consists of **16** printed pages.

1 Whisper is a horse.

(a) Whisper eats three apples every day.

Work out how many apples she eats in 52 weeks.

..... [1]

(b) Whisper is exercised twice a day.
The first time is for 30 minutes.
The second time is for $1\frac{1}{2}$ hours.

(i) Write down the fraction of a day that Whisper is exercised.
Write your answer in its simplest form.

..... [2]

(ii) Write down the fraction of a day that she is **not** being exercised.

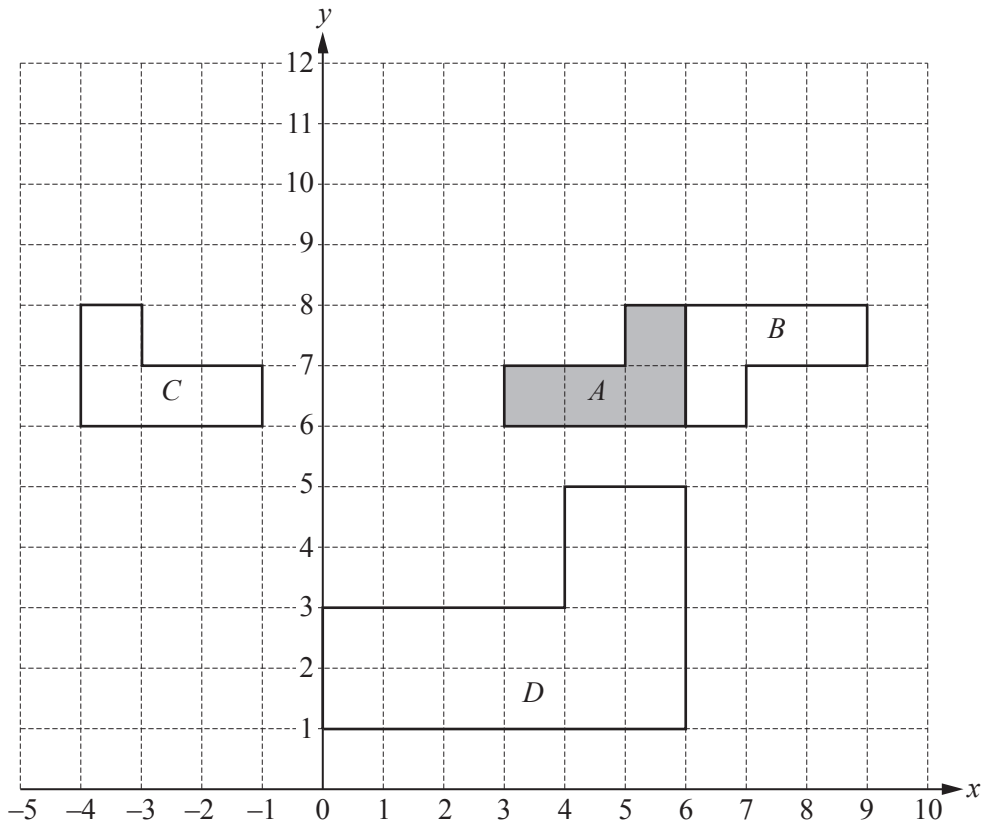
..... [1]

(c) Whisper weighs 429 kg, correct to the nearest kilogram.

Complete the statement about her weight, w kg.

..... $\leqslant w <$ ..... [2]

2



The diagram shows four shapes A, B, C and D.

(a) Describe fully the **single** transformation that maps shape A onto

(i) shape B,

.....

..... [3]

(ii) shape C,

.....

..... [2]

(iii) shape D.

.....

..... [3]

(b) On the grid, draw the image of shape A after a translation by the vector $\begin{pmatrix} -3 \\ 2 \end{pmatrix}$. [2]

3 Ten students each take two French tests.
Their marks are recorded in the table below.

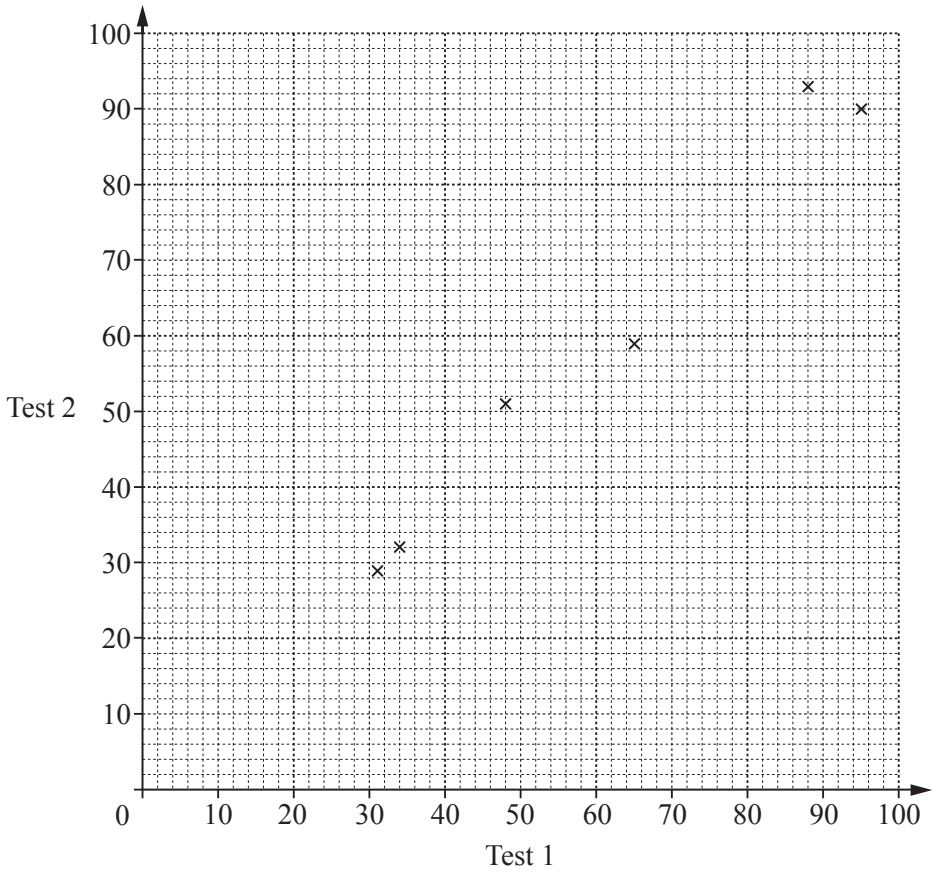
Student	A	B	C	D	E	F	G	H	I	J
Test 1	65	34	95	31	88	48	38	80	100	57
Test 2	59	32	90	29	93	51	37	72	92	54

(a) One of the ten students is chosen at random.

Find the probability that their mark on Test 2 is higher than their mark on Test 1.

..... [1]

(b) (i) Complete the scatter diagram.
The first six points have been plotted for you.



[2]

(ii) What type of correlation is shown on the scatter diagram?

..... [1]

(iii) On the grid, draw the line of best fit. [1]

(iv) Another student scored 45 marks on Test 2.

Use your line of best fit to estimate the mark for this student on Test 1.

..... [1]

(v) A different student scored 10 marks on Test 1.

Explain why you should not use your scatter diagram to estimate their mark on Test 2.

..... [1]

[Turn over

4 **(a)** A farmer has 45 horses and 20 cows.

(i) Write this as a ratio horses : cows.
Give your answer in its simplest form.

..... : ..... [1]

(ii) The farmer wants the ratio horses : cows to equal 5 : 3.
He keeps his 45 horses but buys some more cows.

Work out the number of cows he must buy.

..... [2]

(b) Three years ago the farmer invested $3750 at a rate of 4% per year compound interest.

(i) Calculate the total value of his investment after the 3 years.

$..... [3]

(ii) The farmer wants to spend his investment on buying goats.
Goats cost $126 each.

Work out the maximum number of goats he can buy **and** how much money is left over.

Number of goats .....

Amount of money left over $..... [4]

(c) The farmer grows carrots.
In 2014 the selling price for carrots was \$96 per tonne.
In 2015 this selling price increased by 18%.

Work out the increase in the selling price from 2014 to 2015.

\$..... [1]

(d) The farmer has 20 female sheep.
Each sheep has 0, 1, 2 or 3 lambs.
The table shows this information.

Number of lambs	Number of sheep
0	1
1	4
2	12
3	3

(i) Calculate the mean number of lambs per sheep.

..... [3]

(ii) The farmer takes 1 lamb away from each of the sheep with 3 lambs.
These lambs are given to 3 of the 4 sheep that have 1 lamb.

Complete the table after the farmer has done this.

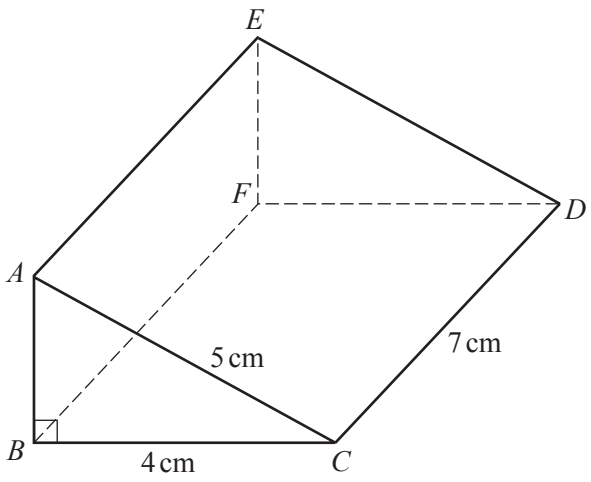
Number of lambs	Number of sheep
0	
1	
2	
3	0

[2]

(iii) Explain why the mean number of lambs per sheep does not change.

..... [1]

5



NOT TO SCALE

The diagram shows a solid in the shape of a triangular prism.
$AC = 5$ cm, $BC = 4$ cm and $CD = 7$ cm.
Angle $ABC = 90°$.

(a) What does the word *prism* tell you about the solid in the diagram?

..... [1]

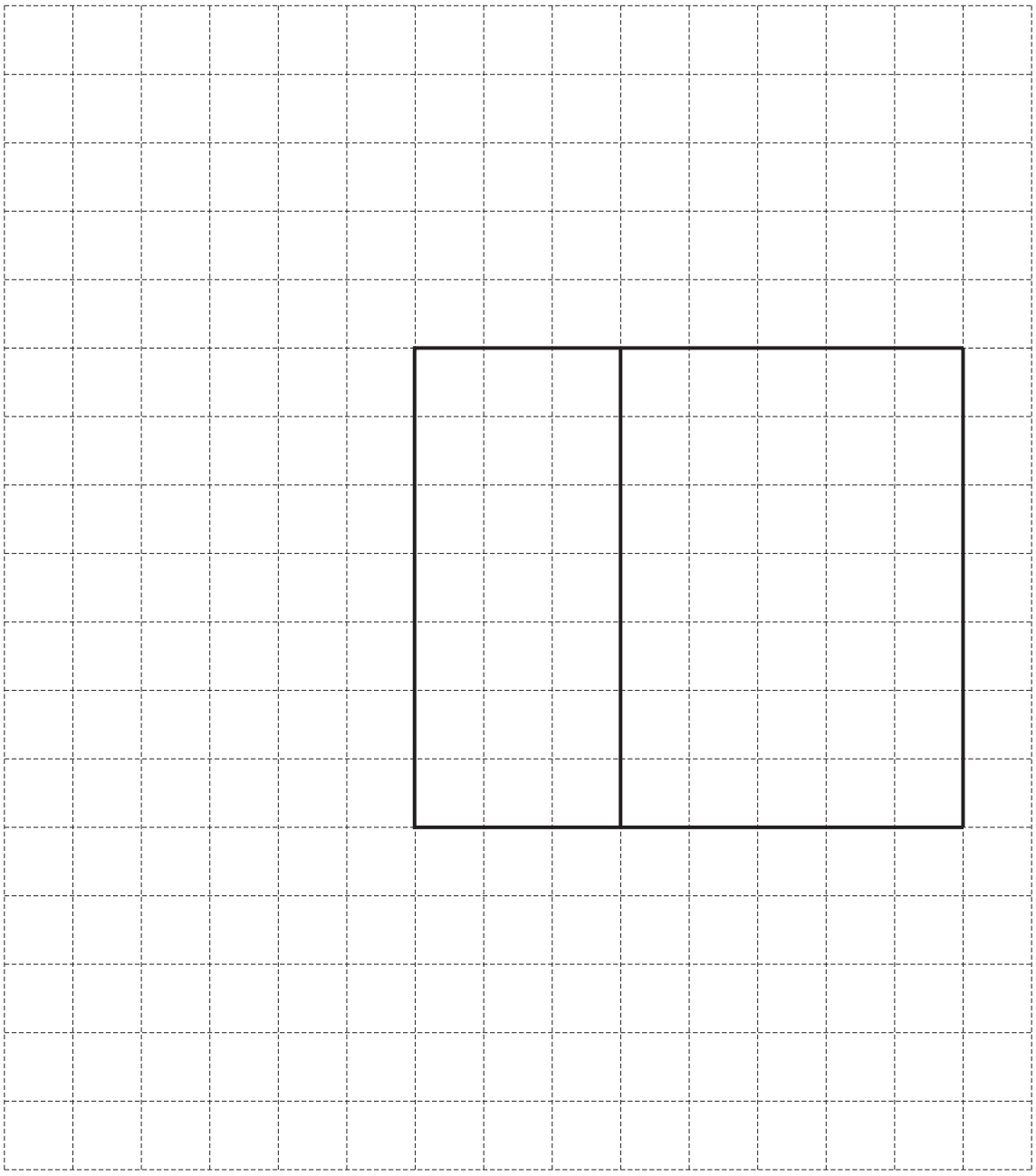
(b) Show that $AB = 3$ cm.

[2]

(c) Calculate the volume of the prism.
Give the units of your answer.

.... [4]

(d) On the 1 cm^2 grid, complete the net of the prism.
Two faces have been drawn for you.

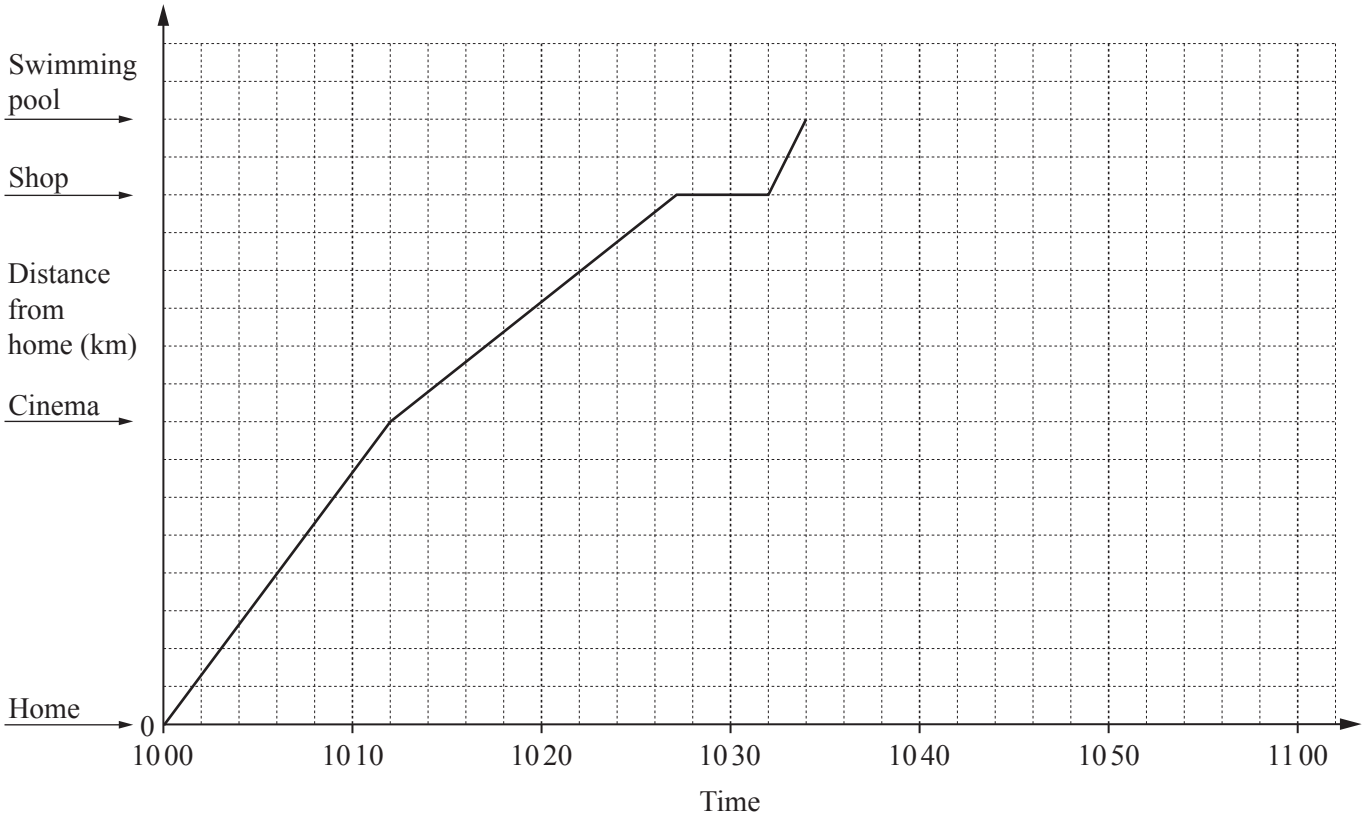


[3]

(e) Calculate the surface area of the prism.

..... cm^2 [2]

6



Abjit cycles from his home to the swimming pool.
The travel graph for his journey is drawn on the grid.
On his journey he passes the cinema and the shop.

(a) Write down where Abjit stops on his journey to the swimming pool.

..... [1]

(b) Abjit is cycling fastest between the shop and the swimming pool.

Explain how you know this from looking at the graph.

..... [1]

(c) Abjit cycles at 20 km/h from his home to the cinema.
This part of the journey takes 12 **minutes**.

(i) Show that the distance from Abjit's home to the cinema is 4 km.

[2]

(ii) Complete the scale on the vertical axis of the grid by showing at least two other values. [1]

(d) Calculate the speed, in km/h, that Abjit cycles from the cinema to the shop.

..... km/h [2]

(e) When Abjit arrives at the swimming pool it is closed.
Without stopping at the swimming pool he cycles home at a constant speed.
It takes him 24 minutes to cycle home.

Complete the travel graph for his journey home. [1]

(f) Calculate the average speed, in km/h, for the **whole journey**.

..... km/h [3]

(g) Abjit's bicycle wheel has a radius of 29 cm.

(i) Calculate the circumference of the wheel.
Give your answer correct to 1 decimal place.

..... cm [3]

(ii) Calculate the number of complete turns the wheel makes when travelling 500 m.

..... [2]

[Turn over

7 Burton City is a football team.

(a) Burton City has 1732 supporters who want to travel to the next game.
The football club hires some buses.
Each bus seats 52 supporters.

(i) Work out the number of buses needed to take these supporters to the game.

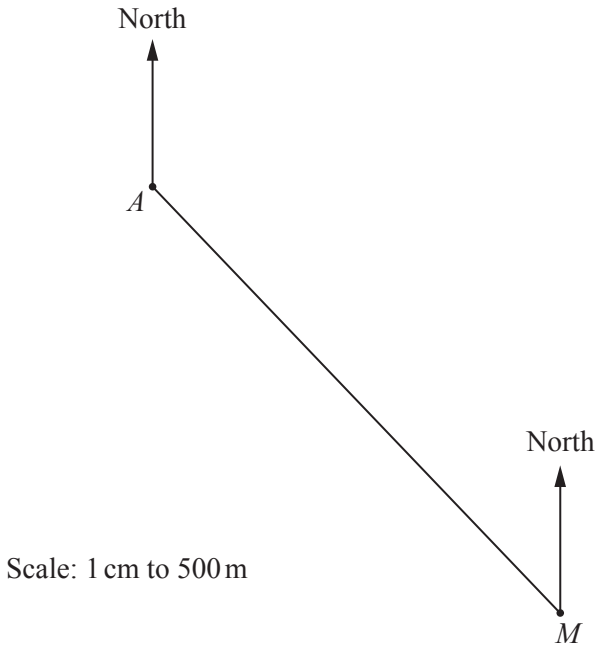
..... [2]

(ii) The cost of the buses will be shared equally amongst these supporters.
Each bus costs \$198 to hire.

Work out the amount that each supporter must pay.
Give your answer correct to the nearest 10 cents.

\$ ..... [3]

(b) Adam and Mabel are two supporters.
The scale drawing shows the positions of Adam's home, *A*, and Mabel's home, *M*.
The scale is 1 centimetre represents 500 metres.



Scale: 1 cm to 500 m

(i) Work out the distance in kilometres from *A* to *M*.

..... km [2]

(ii) Burton City's football ground is on a bearing of 105° from A and on a bearing of 068° from M.

Mark the position of the football ground on the scale drawing. [3]

(c) Teams are given points for winning or drawing games.
A win is given w points and a draw is given d points.
No points are given when the team loses.

(i) Burton City has 24 points after winning 2 games and drawing 5 games.

Complete the equation.

$2w + 5d =$ ..... [1]

(ii) Sowton Rovers is another football team.
Sowton Rovers has 29 points after winning 3 games and drawing 4 games.

Write this information as an equation.

..... = ... [2]

(iii) Solve your two equations to find the number of points for a win and the number of points for a draw.
You must show all your working.

$w =$ .....

$d =$ ..... [4]

(iv) Another team, Cranbrook United, has played 12 games.
It has won 4 games, drawn 5 games and lost 3 games.

Work out the number of points Cranbrook United has after 12 games.

..... [1]

[Turn over

8 Complete part (a) and part (b) using a straight edge and compasses only. Show all your construction arcs.

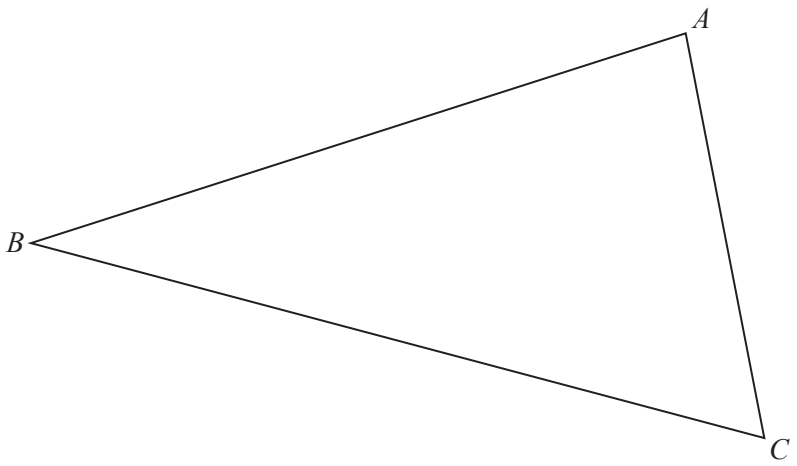
(a) Construct the locus of points that are equidistant from the points X and Y.

X •

• Y

[2]

(b) (i) Construct the locus of points that are equidistant from line AB and line AC.

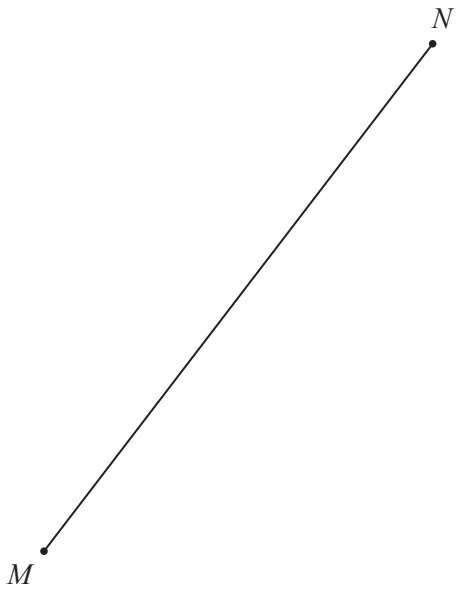


[2]

(ii) Shade the region, inside the triangle, which is closer to AB than to AC. [1]

(c) Complete this part using a ruler and compasses only.
Show all your construction arcs.

Construct the locus of points that are 4 cm from the line *MN*.



[3]

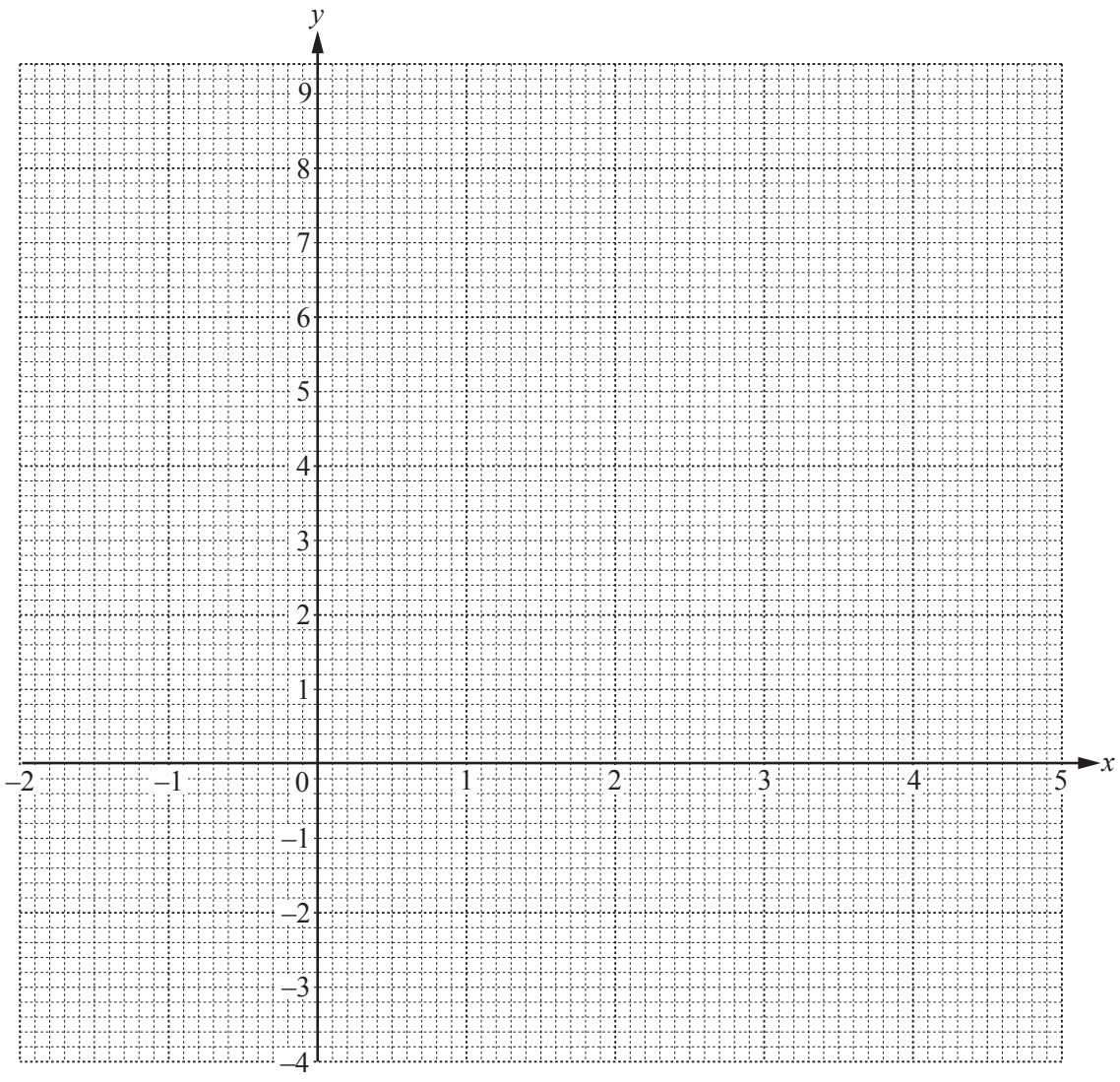
Question 9 is printed on the next page.

9 **(a)** Complete the table of values for $y = x^2 - 3x - 1$.

x	–2	–1	0	1	2	3	4	5
y	9		–1					

[3]

(b) On the grid, draw the graph of $y = x^2 - 3x - 1$ for $-2 \leqslant x \leqslant 5$.



[4]

(c) Write down the co-ordinates of the lowest point of the graph.

(..... , ...) [1]

(d) **(i)** On the grid, draw the line of symmetry of the graph. [1]

(ii) Write down the equation of the line of symmetry of the graph.

..... [1]