Mock Grade 8/9

Maths Booklet 4

Paper 2H
Calculator

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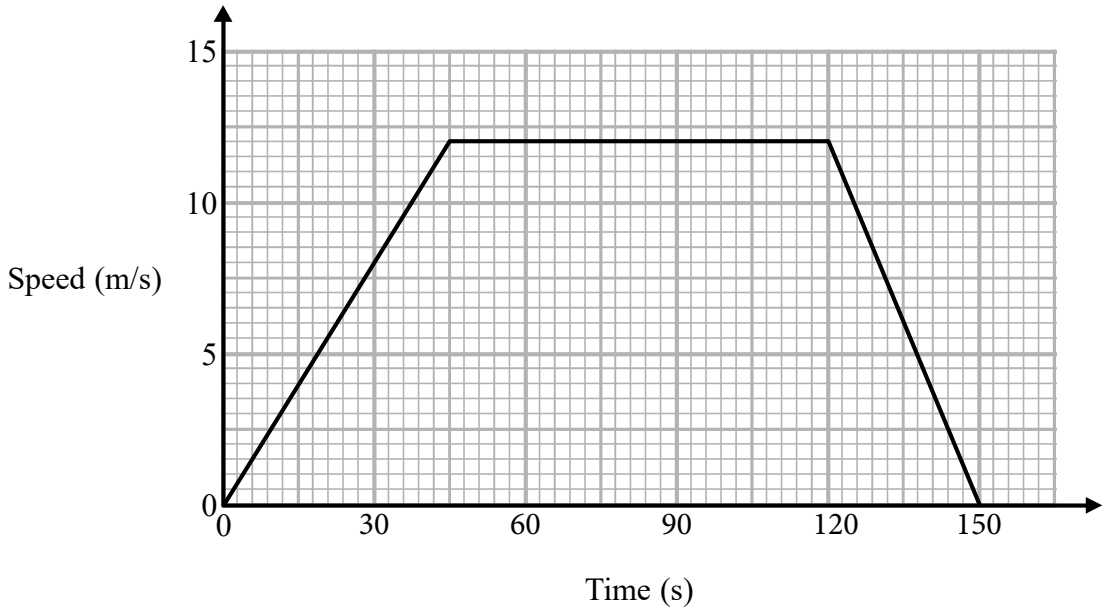
1 Here is a speed-time graph for a train journey between two stations.
The journey took 150 seconds.



(a) Calculate the time taken by the train to travel a third of the distance between the two stations.
You must show all your working.

..... seconds
(4)

(b) Compare the acceleration of the train during the first part of its journey with the acceleration of the train during the last part of its journey.

.....

.....

.....

(1)

(Total for Question 1 is 5 marks)

2 The number of rabbits on a farm at the end of month n is P_n
The number of rabbits at the end of the next month is given by $P_{n+1} = 1.1P_n - 50$

At the end of March there are 300 rabbits on the farm.

(a) Work out how many rabbits there will be on the farm at the end of June.

.....

(3)

(b) Considering your results in part (a), suggest what will happen to the number of rabbits on the farm after a long time.

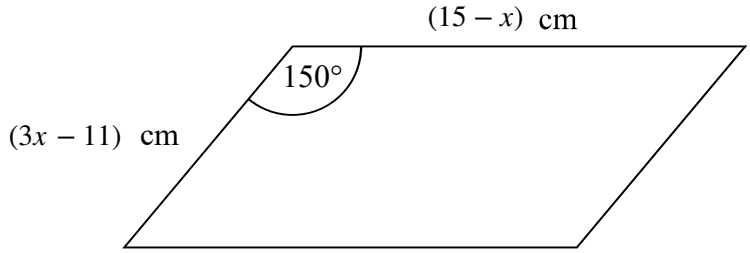
.....

.....

(1)

(Total for Question 2 is 4 marks)

3 The diagram shows a parallelogram.



The area of the parallelogram is greater than 48 cm^2

(a) Show that $3x^2 - 56x + 261 < 0$

(3)

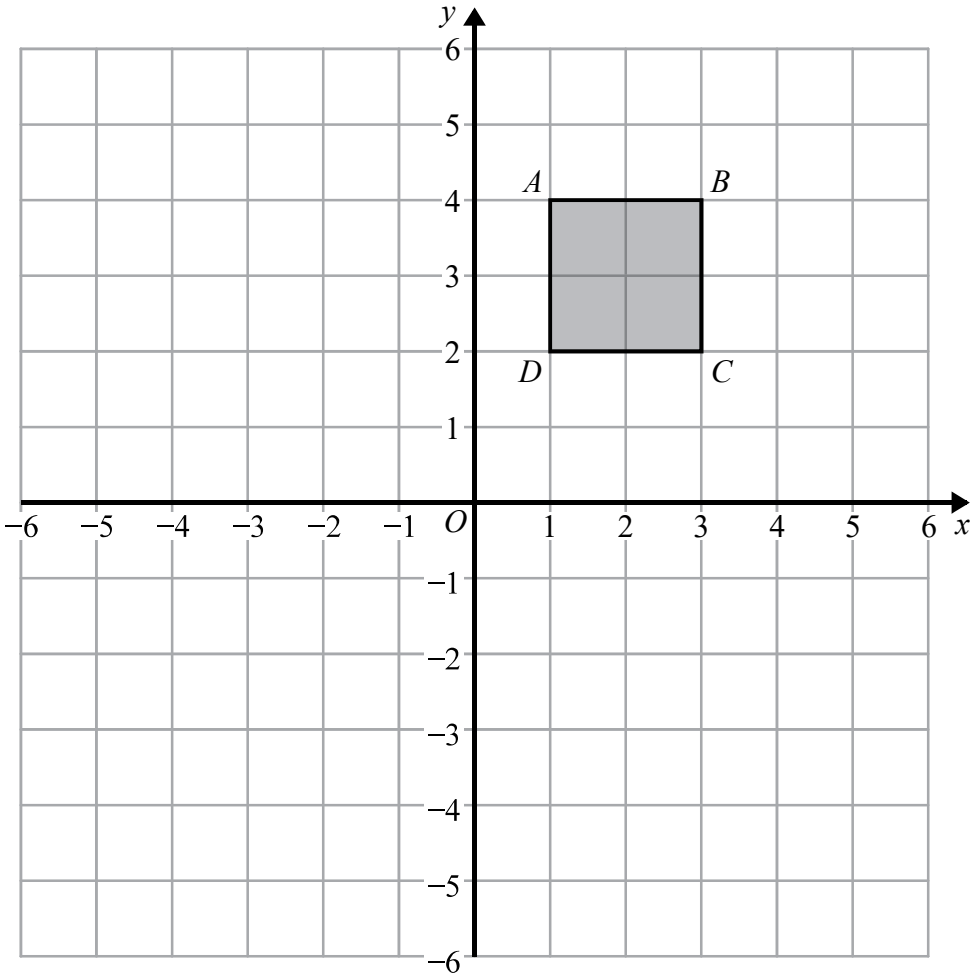
(b) Find the range of possible values of x.

.....

(3)

(Total for Question 3 is 6 marks)

4



Square $ABCD$ is transformed by a combined transformation of a reflection in the line $y = 0$ followed by a rotation.

Under the combined transformation, two vertices of the square $ABCD$ are invariant.

Describe fully one possible rotation.

.....

(Total for Question 4 is 2 marks)

5 The straight line **L** has equation $x + 3y = 27$

The point A has coordinates $(2, 5)$
The straight line **M** is perpendicular to **L** and passes through A.

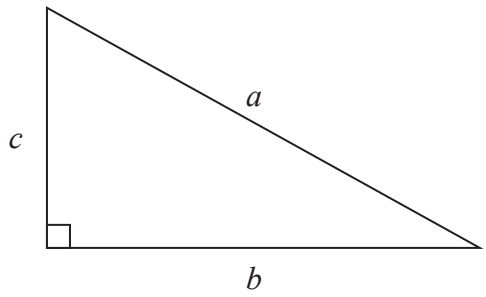
Line **L** crosses the y-axis at the point B.
Lines **L** and **M** intersect at the point C.

Work out the area of triangle ABC.
You must show all your working.

.....

(Total for Question 5 is 5 marks)

6



a is 9.7 cm correct to the nearest mm
b is 7.8 cm correct to the nearest mm

Calculate the upper bound for *c*.
You must show your working.

..... cm

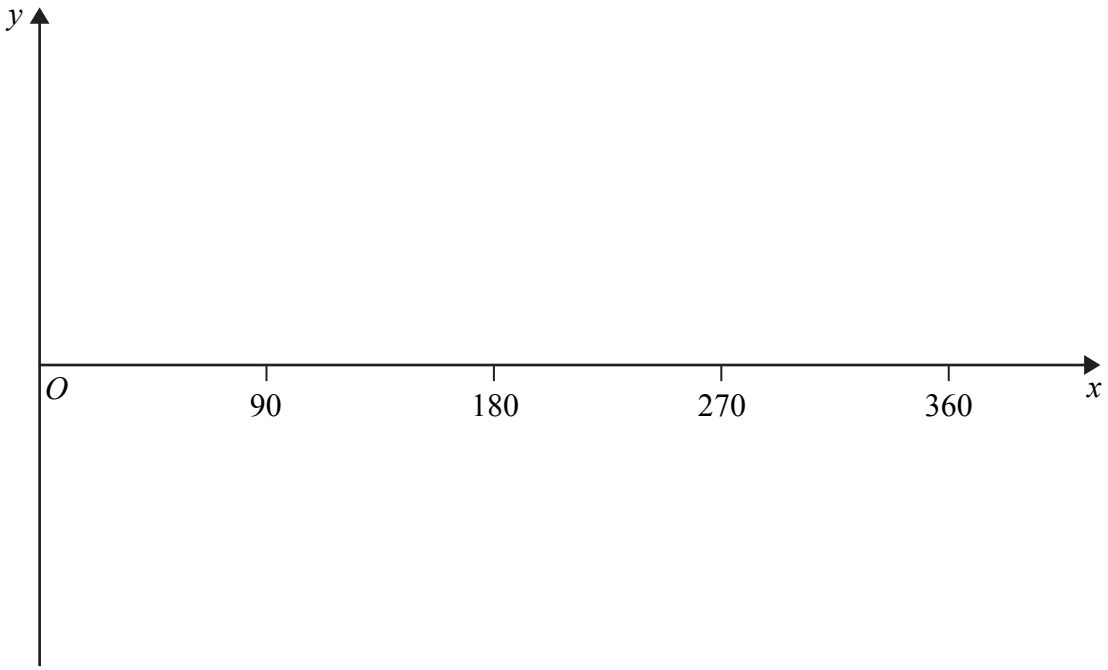
(Total for Question 6 is 4 marks)

7 Simplify fully $(2a + \sqrt{b})^2$

.....

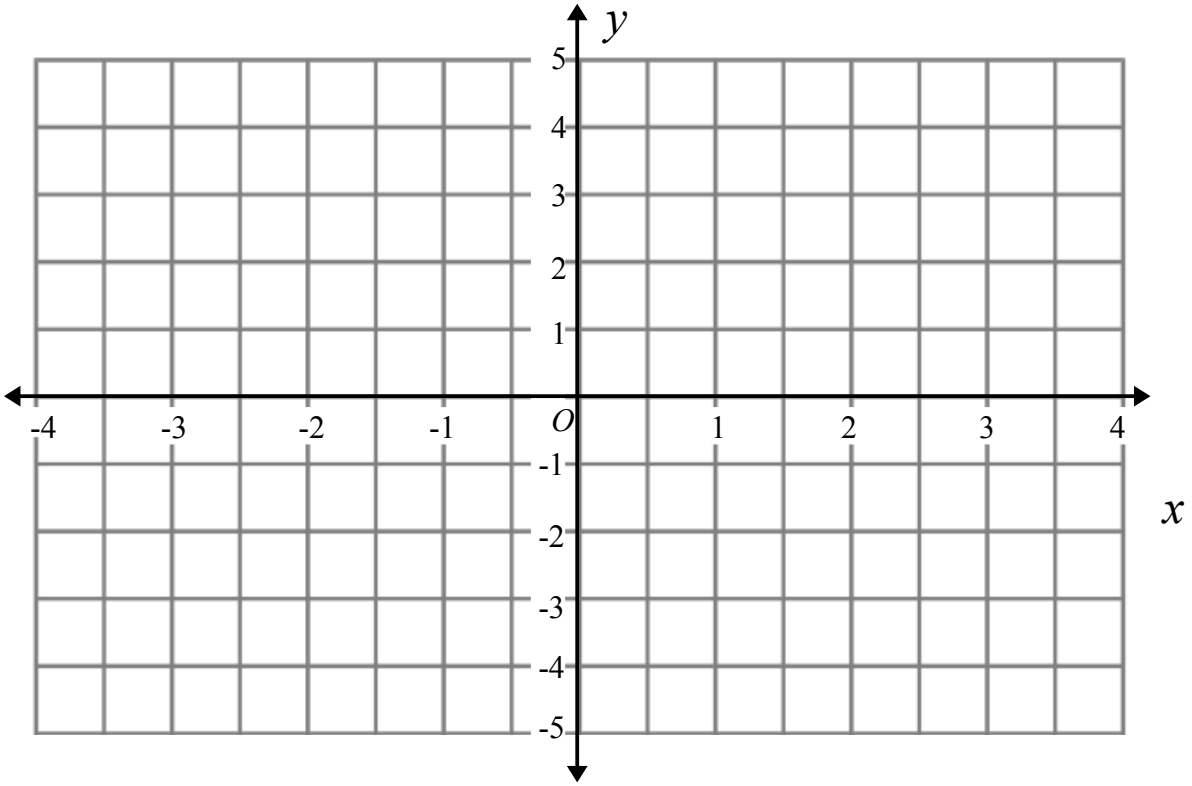
(Total for Question 7 is 3 marks)

8 (a) Sketch the graph of $y = \sin x°$ for $0 \leqslant x \leqslant 360$



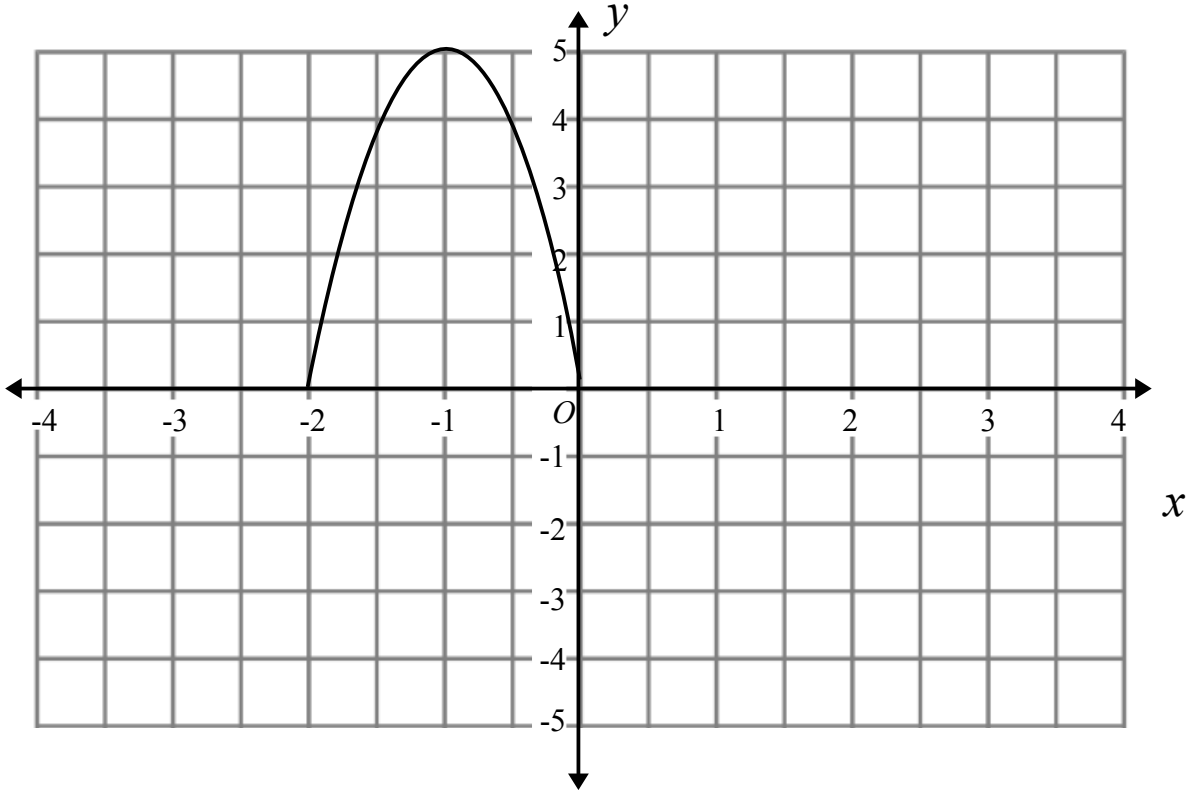
(2)

8 The graph of $y = f(x)$ is shown on both grids below.



(a) On the grid above, sketch the graph of $y = -f(x)$.

(2)



(b) n the grid above, sketch the graph of $y = f(x - 1)$

(2)

(Total for question 8 is 6 marks)

25 The diagram shows two circles such that the region **R**, shown shaded in the diagram, is the region common to both circles.

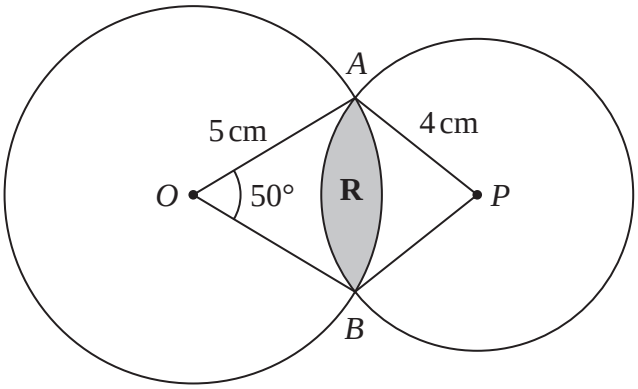


Diagram **NOT** accurately drawn

One of the circles has centre O and radius 5 cm.
The other circle has centre P and radius 4 cm.
Angle $AOB = 50°$

Calculate the area of region **R**.
Give your answer correct to 3 significant figures.

..... cm^2

(Total for Question 25 is 6 marks)