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## **General Certificate of Secondary Education** January 2010

### **Mathematics**



Module N3 Paper 2 (With calculator) Higher Tier [GMN32]

**TUESDAY 12 JANUARY** 10.30 am - 11.30 am

### TIME

1 hour.

## INSTRUCTIONS TO CANDIDATES

Write your Centre Number and Candidate Number in the spaces provided at the top of this page.

Write your answers in the spaces provided in this question paper. Answer all thirteen questions.

Any working should be clearly shown in the spaces provided since marks may be awarded for partially correct solutions.

#### INFORMATION FOR CANDIDATES

The total mark for this paper is 44.

Figures in brackets printed down the right-hand side of pages indicate the marks awarded to each question or part question.

You should have a calculator, ruler, compasses, set-square and protractor.

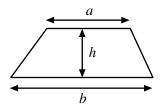
The Formula Sheet is on page 2.

For Examiner's use only					
Question Number	Marks				
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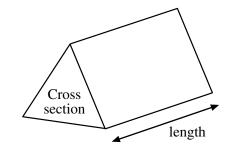
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# **Formula Sheet**

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



**Volume of prism** = area of cross section  $\times$  length

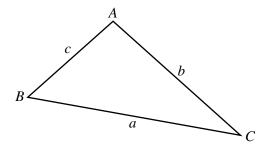


In any triangle ABC

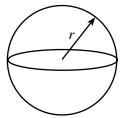
**Area of triangle** =  $\frac{1}{2} ab \sin C$ 

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

**Cosine rule:**  $a^2 = b^2 + c^2 - 2bc \cos A$ 

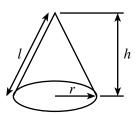


Volume of sphere =  $\frac{4}{3}\pi r^3$ Surface area of sphere =  $4\pi r^2$ 



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

Curved surface area of cone =  $\pi rl$ 



**Quadratic equation:** 

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

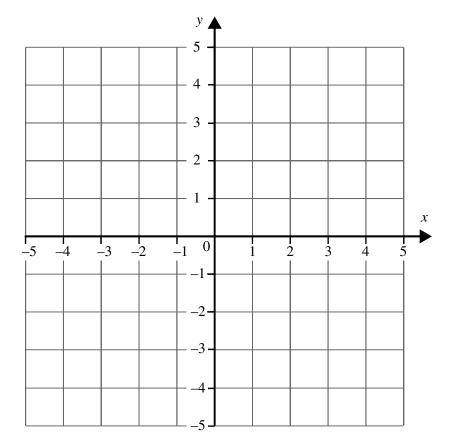
$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

1 Calculate  $\frac{4.3 \times 3.9}{7.8 - 1.9}$  correct to one decimal place.

Examin	er Only
Marks	Remark

Answer \_\_\_\_\_ [2]

2 (a) Draw the graph of y = 2x - 3 on the grid below.



[3]

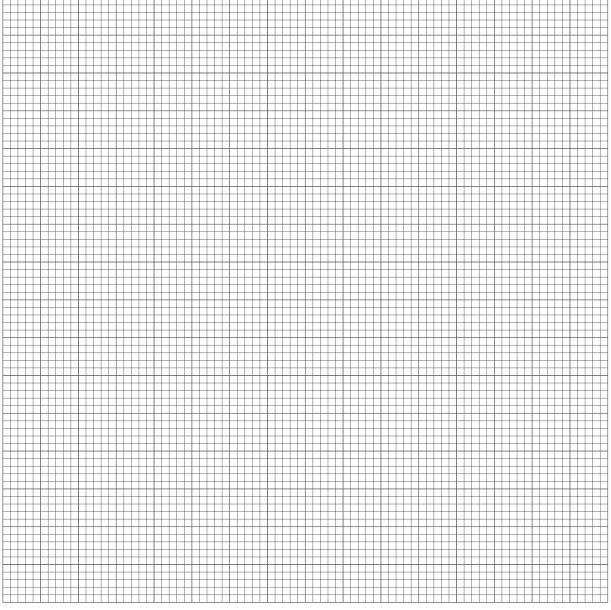
**(b)** Factorise 6 + 10x

Answer \_\_\_\_\_ [1]

**3** Penny recorded the play time of each of the tracks on her iPod. The results are recorded in the table below.

Time (t seconds)	$90 < t \le 120$	$120 < t \le 150$	$150 < t \le 180$	$180 < t \le 210$	$210 < t \le 240$
Frequency	22	35	18	10	6

(a) Show this information on a grouped frequency diagram.



[3]

**(b)** What is the modal class interval?

Answer \_\_\_\_\_ [1]

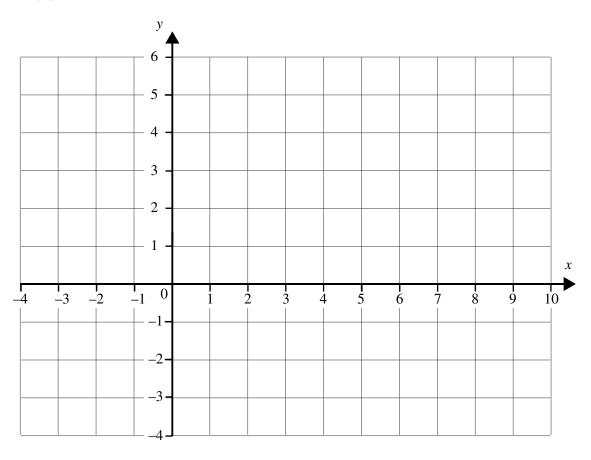


4 (a) Change  $4.6 \,\mathrm{m}^2$  into  $\mathrm{cm}^2$ .

Examiner Only			
Marks	Remark		

Answer \_\_\_\_\_ cm<sup>2</sup> [2]

**(b)** 



G is the point (-2, 4). H is the point (8, -2). Find the co-ordinates of the midpoint of GH.

Answer ( \_\_\_\_\_, , \_\_\_\_) [2]

# 5 The lines PQ and RS are parallel.

Write down the size of angles a and b.

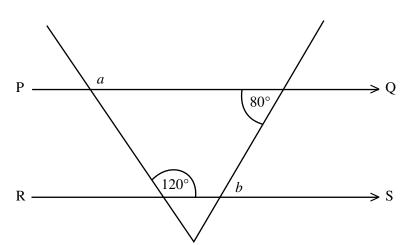


Diagram not drawn accurately

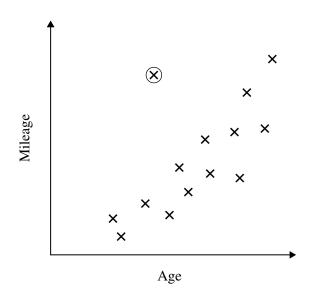
Answer $a = 1$	0
b = 1	 ° [2]

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Marks	Remark

6		Examin	
		Marks	Remark
	Calculate the perimeter of a semicircle with diameter 8 cm.		
	Answer [4]		
7	In September, Georgina received £600 commission on sales she had made that month.  In October she received 15% less than September.  In November her commission <b>increased</b> by 18% and in December by 25% on the previous month.  How much commission did Georgina receive in December?		
	Show all your working.		
	Answer £ [3]		

**8** (a) The scatter graph shows the relationship between the ages of cars and their mileage.





Suggest a reason for the unusual point (circled).

Answer \_\_\_\_\_

\_\_\_\_\_\_[1]

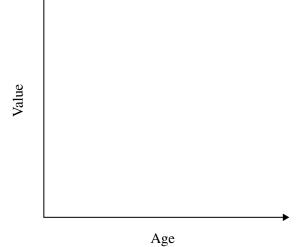
<b>(b)</b>	<b>(i)</b>	What type of correlation	exists	between	the	ages	of	cars	and	their
		value?								

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Answer	111

(ii) Sketch a scatter graph with at least six points to illustrate this correlation.



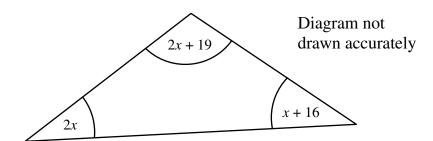


(c) Write down a variable for cars which would have no correlation to the ages of the cars.

	_	
Answer		1

9 The size of the angles, in degrees, of the triangle below are 2x, 2x + 19 and x + 16.

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(a) Use the information to write down an equation in terms of x.

Answer \_\_\_\_\_\_[1]

(b) Solve your equation to find the value of x.

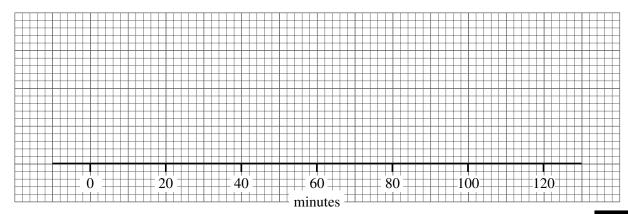
Answer  $x = _{\circ} [2]$ 

- 10 A tennis club holds a Junior Tournament.

  The time taken to complete each match is recorded.
  - (a) The statistical data for the girls' matches is:

Minimum time	42 minutes
Maximum time	104 minutes
Lower quartile	68 minutes
Upper quartile	90 minutes
Median time	84 minutes

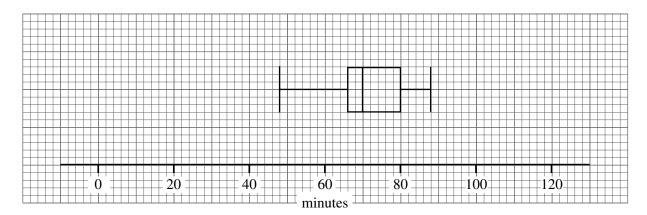
Draw a box plot to illustrate this data.



[2]

Examiner Only				
Marks	Remark			

(b) Similar data is recorded for the boys' matches and a box plot drawn.



Give **two** comments on the times taken to complete the girls' matches compared to the times taken to complete the boys' matches.

		[1]

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Examiner Only				
Marks	Remark			

[Turn over

11	St Elsewhere High	School had an	8% absence rate on	a particular day.
11	of Lisewhere Then	ochool maa an	o /c absence rate on	a particular day.

If there were 989 pupils present, how many pupils were absent?

<b>Examiner Only</b>				
Marks	Remark			

Answer \_\_\_\_\_ [3]

**12** 

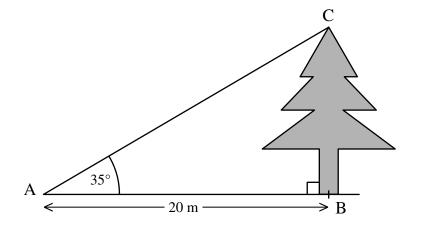


Diagram not drawn accurately

The angle of elevation from A to the top of the tree C is  $35^{\circ}$ . The distance AB =  $20 \,\text{m}$ .

Calculate the height BC of the tree.

Answer \_\_\_\_\_ m [3]

13	(a)	Expand	and s	simplify	(3x -	+ 5)(	(4x-2)	2)
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**(b)** Factorise  $x^2 - 3x - 40$ 

Answer	_ [2]	
Answer	_ [2]	

THIS IS THE END OF THE QUESTION PAPER



