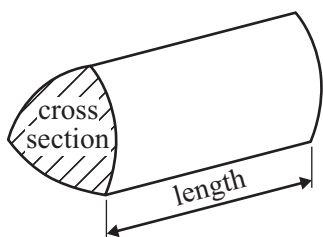


GCSE Mathematics (Linear) 1380

Formulae: Higher Tier

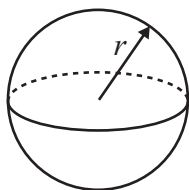
You must not write on this formulae page.
Anything you write on this formulae page will gain NO credit.

Volume of a prism = area of cross section \times length



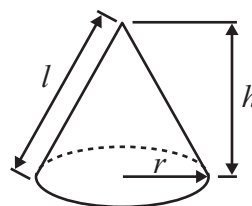
Volume of sphere = $\frac{4}{3}\pi r^3$

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

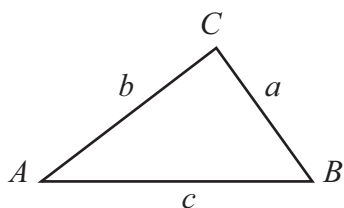


Volume of cone = $\frac{1}{3}\pi r^2 h$

Curved surface area of cone = $\pi r l$



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 EIGHTEEN questions.

Write your answers in the spaces provided.

You must write down all stages in your working.

You must NOT use a calculator.

1. Here is a list of ingredients for making **10** Flapjacks.

<p>Ingredients for 10 Flapjacks</p> <p>80 g rolled oats</p> <p>60 g butter</p> <p>30 m/ golden syrup</p> <p>36 g light brown sugar</p>

Work out the amount of each ingredient needed to make **15** Flapjacks.

- g rolled oats
- g butter
- m/ golden syrup
- g light brown sugar

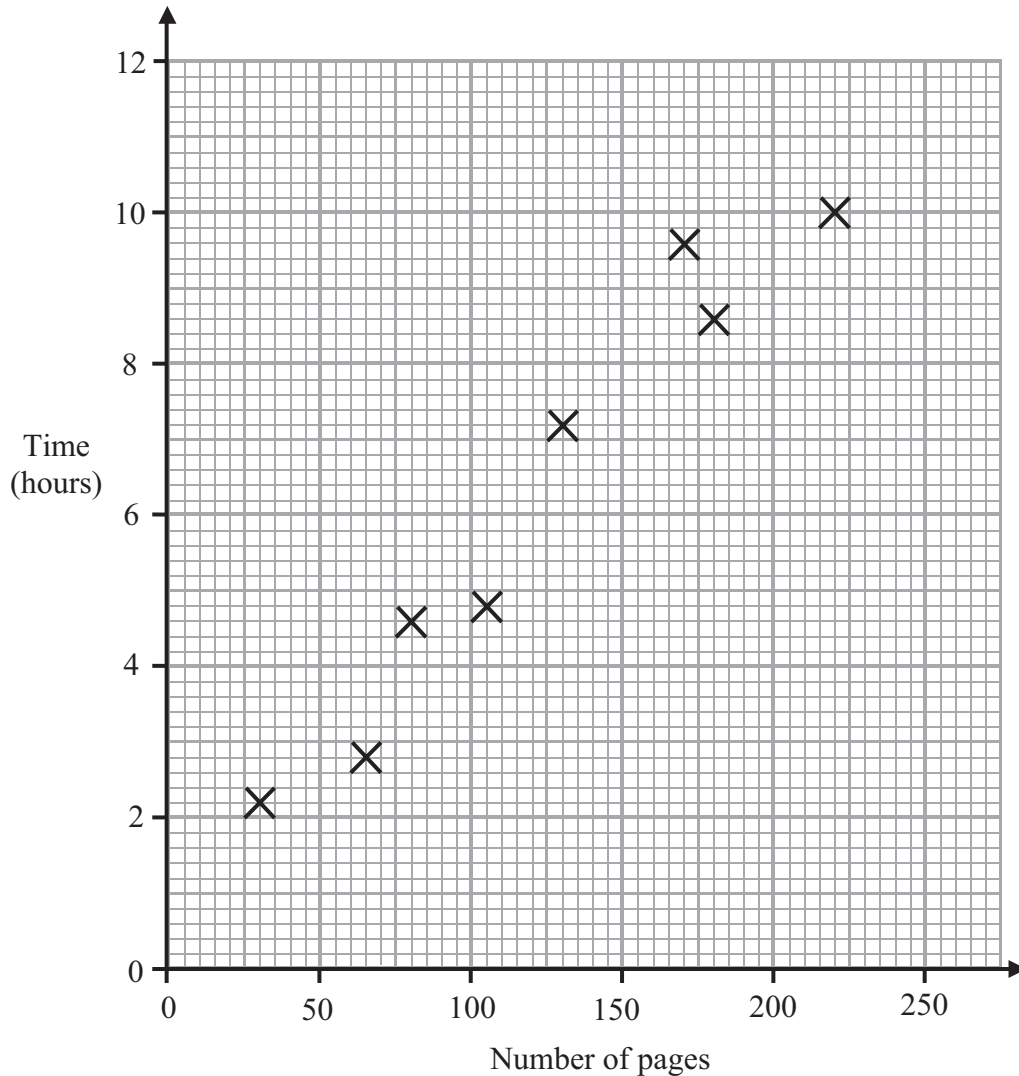
(Total 3 marks)

Q1

2. Harriet reads eight books.

For each book she recorded the number of pages and the time she takes to read it.

The scatter graph shows information about her results.



(a) Describe the relationship between the number of pages in a book and the time Harriet takes to read it.

.....
(1)

Harriet reads another book.
 The book has 150 pages.

(b) Estimate the time it takes Harriet to read it.

..... hours
(2)

(Total 3 marks)

Q2

3.

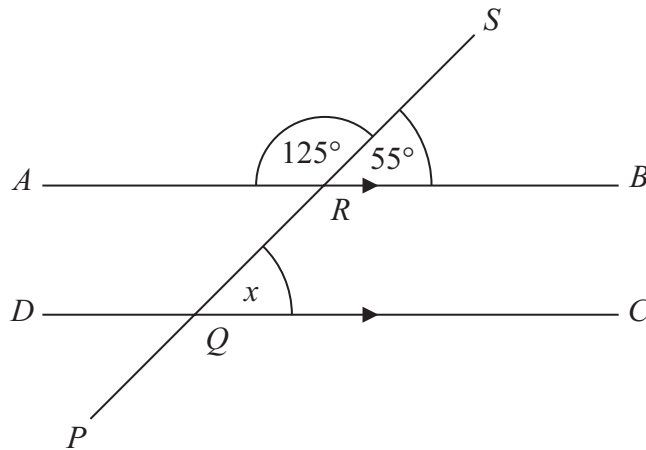


Diagram **NOT** accurately drawn

ARB is parallel to DQC .

$PQRS$ is a straight line.

Angle $SRB = 55^\circ$.

(i) Find the size of the angle marked x .

.....^o

(ii) Give a reason for your answer.

.....

(Total 2 marks)

Q3

4. Work out an estimate for $\frac{7.19 \times 19.7}{0.46}$

.....

(Total 3 marks)

Q4

5. $h = 5t^2 + 2$

(a) (i) Work out the value of h when $t = -2$

.....

(ii) Work out a value of t when $h = 47$

.....

(3)

(b) $-1 \leq n < 4$

n is an integer.

Write down all the possible values of n .

.....

(2)

(Total 5 marks)

Q5

6. Each exterior angle of a regular polygon is 30° .

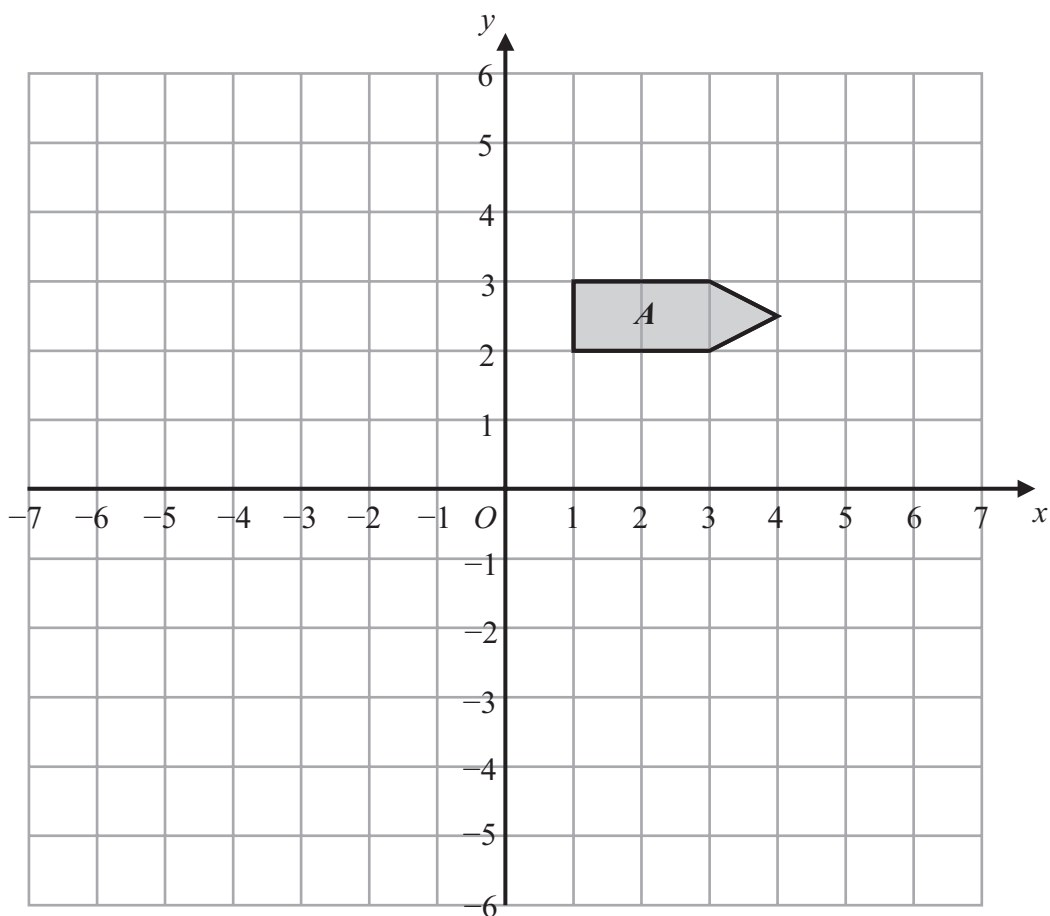
Work out the number of sides of the polygon.

.....

(Total 2 marks)

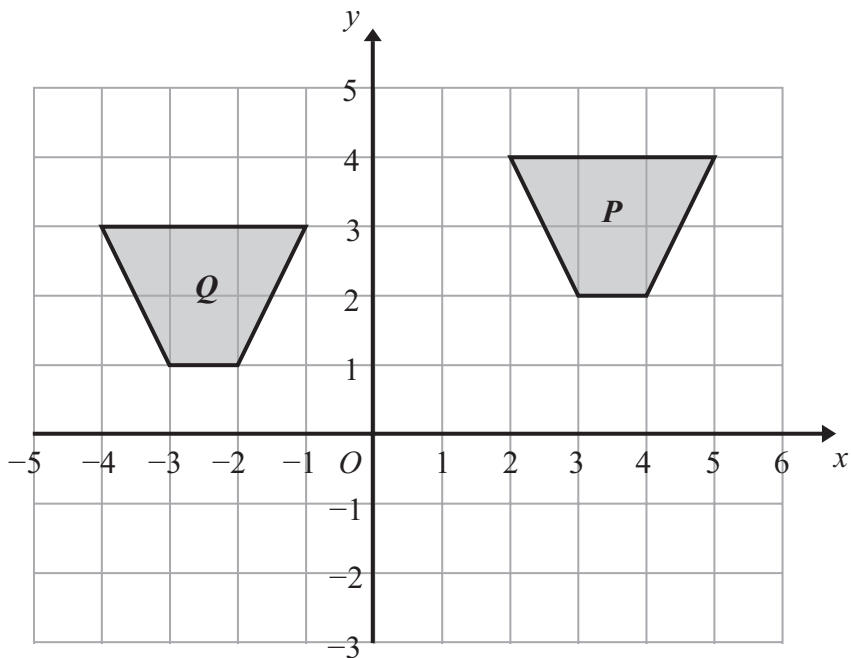
Q6

7.



(a) On the grid above, reflect shape *A* in the line $x = -1$

(2)



(b) Describe fully the single transformation that will map shape *P* onto shape *Q*.

.....

(2)
 (Total 4 marks)

8. Sophie wants to find out the amount of time people exercise. She will use a questionnaire.

- (a) Design a suitable question for Sophie to use in her questionnaire. You must include some response boxes.

(2)

Sophie asks the people at her swimming pool to complete her questionnaire. This may **not** be a suitable sample.

- (b) Give a reason why.

.....
.....

(1)

(Total 3 marks)

Q8

9. The n th term of a number sequence is given by $3n + 1$

- (a) Work out the first **two** terms of the number sequence.

.....
(1)

Here are the first four terms of another number sequence.

1 5 9 13

- (b) Find, in terms of n , an expression for the n th term of this number sequence.

.....
(2)

(Total 3 marks)

Q9

10.

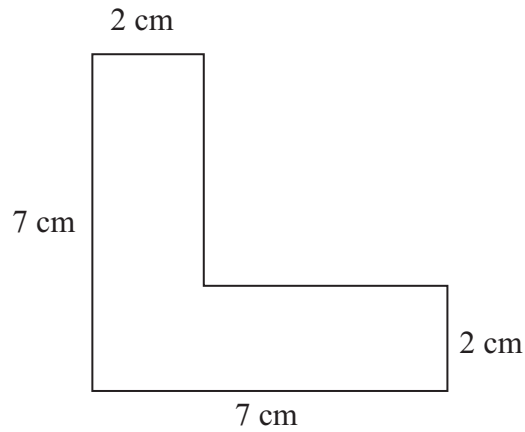


Diagram **NOT** accurately drawn

The diagram shows the cross-section of a solid prism.
The length of the prism is 2 m.

The prism is made from metal.
The density of the metal is 8 grams per cm^3 .

Work out the mass of the prism.

Q10

.....
(Total 5 marks)

Leave
blank

11. Peter, Tarish and Ben share £54

Tarish gets three times as much money as Peter.
Ben gets twice as much money as Tarish.

How much money does Ben get?

£

(Total 3 marks)

Q11

12. (a) Simplify

(i) $w^6 \times w^4$

.....

(ii) $h^8 \div h^3$

.....

(2)

(b) Simplify completely $\frac{12xy^3}{3x^2y^3}$

.....

(2)

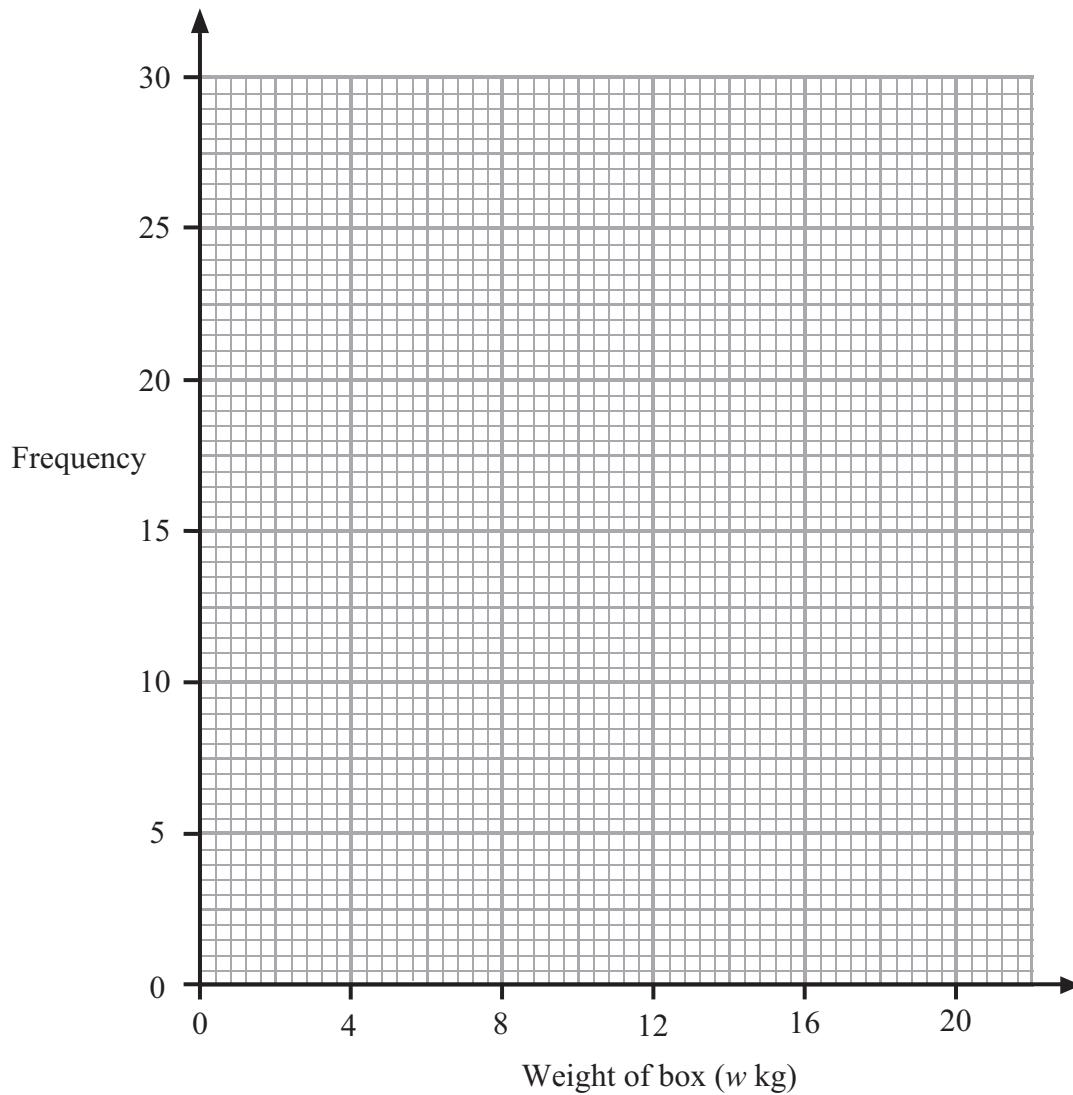
(Total 4 marks)

Q12

13. The table shows some information about the weights, in kg, of 100 boxes.

Weight of box (w kg)	Frequency
$0 < w \leq 4$	10
$4 < w \leq 8$	17
$8 < w \leq 12$	28
$12 < w \leq 16$	25
$16 < w \leq 20$	20

Draw a frequency polygon to show this information.



14. (a) Expand $x(x + 2)$

.....
(2)

(b) Expand and simplify $(x + 3)(x - 4)$

.....
(2)

(c) Factorise completely $2y^2 - 4y$

.....
(2)

(d) Factorise $x^2 - 9$

.....
(1)

(Total 7 marks)

Q14

15.

(a) Work out $\frac{2}{3} \div \frac{5}{6}$

Give your fraction in its simplest form.

.....
(3)

(b) Work out $2\frac{1}{3} - 1\frac{2}{5}$

.....
(3)

(Total 6 marks)

Q15

16. Solve the simultaneous equations

$$4x + y = 10$$

$$2x - 3y = 19$$

$$x = \dots\dots\dots$$

$$y = \dots\dots\dots$$

(Total 3 marks)

Q16

17. The table shows information about the time, m minutes, it takes to show each of 120 films.

Time (m minutes)	Frequency
$70 < m \leq 80$	4
$80 < m \leq 90$	12
$90 < m \leq 100$	34
$100 < m \leq 110$	32
$110 < m \leq 120$	26
$120 < m \leq 130$	12

(a) Write down the modal class interval.

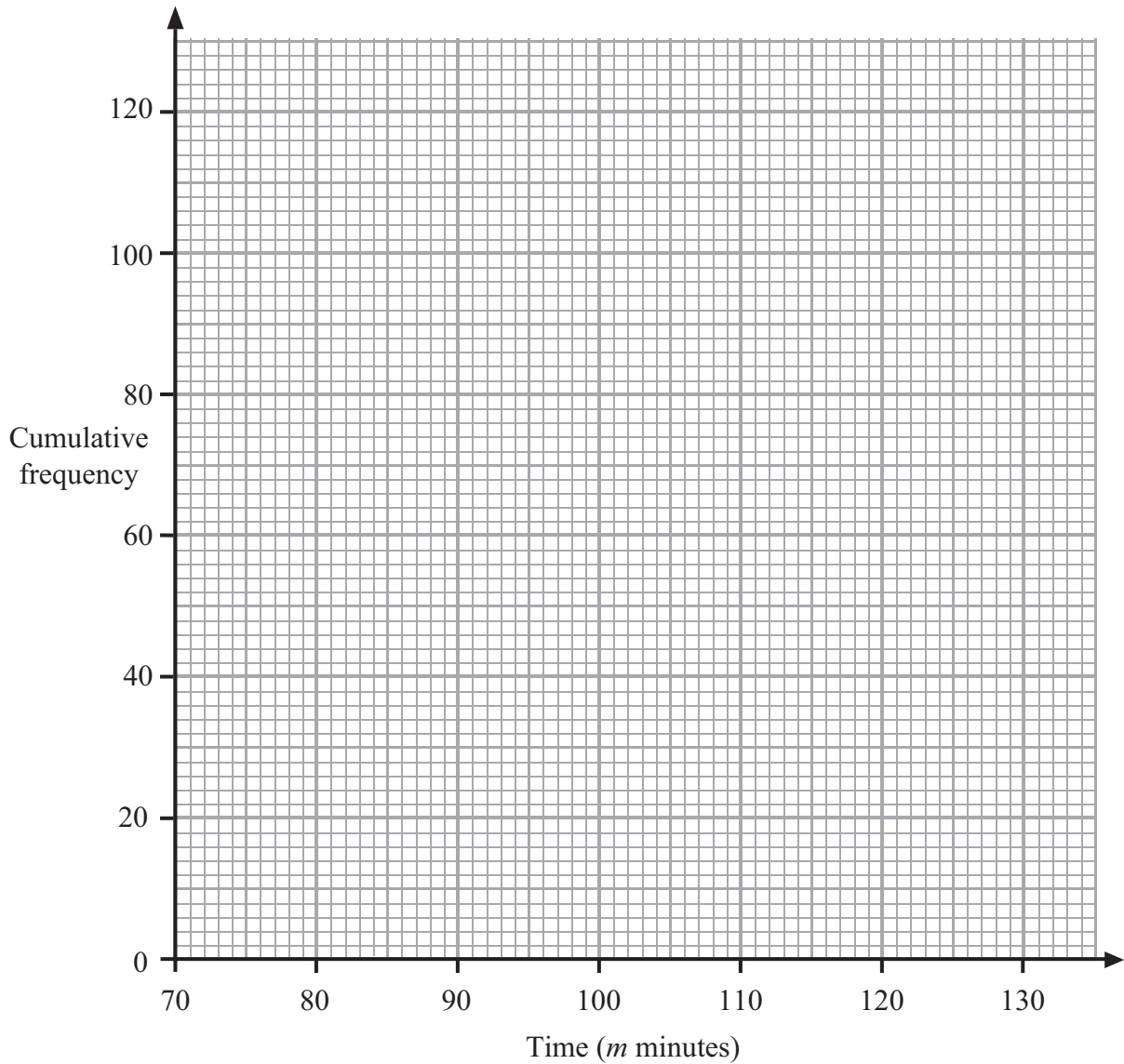
.....
(1)

(b) Complete the cumulative frequency table.

Time (m minutes)	Cumulative frequency
$70 < m \leq 80$	4
$70 < m \leq 90$	
$70 < m \leq 100$	
$70 < m \leq 110$	
$70 < m \leq 120$	
$70 < m \leq 130$	

(1)

(c) On the grid, draw a cumulative frequency graph for your cumulative frequency table.



(2)

(d) Use your graph to find an estimate for the median.

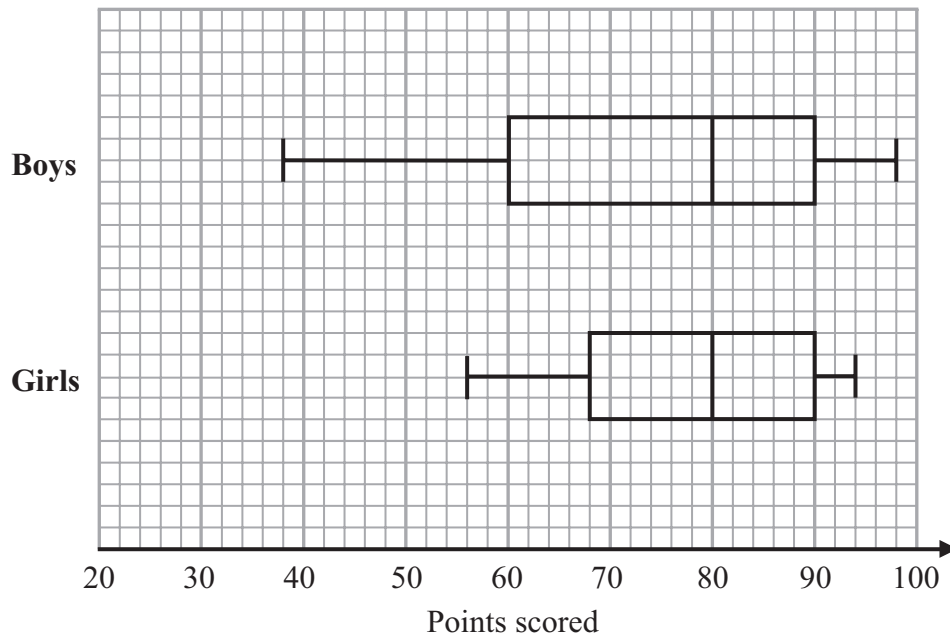
..... minutes

(1)

(Total 5 marks)

Q17

18. The box plots show information about the points scored by some students in a spelling competition.



Compare the distributions of the boys' scores and the girls' scores.

.....

.....

.....

(Total 2 marks)

Q18