

New Specification



General Certificate of Secondary Education
January 2012

StudentBounty.com

71
Candidate Number

Mathematics

Unit T4
(With calculator)
Higher Tier
[GMT41]



WEDNESDAY 11 JANUARY
9.15 am–11.15 am



For Examiner's use only	
Question Number	Marks
1	
2	
3	
4	
5	
6	
7	
8	
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10	
11	
12	
13	
14	
15	
16	
17	
18	
Total Marks	

TIME

2 hours.

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 eighteen** questions.
Any working should be clearly shown in the spaces provided since marks may be awarded for partially correct solutions.
You **may** use a calculator for this paper.

INFORMATION FOR CANDIDATES

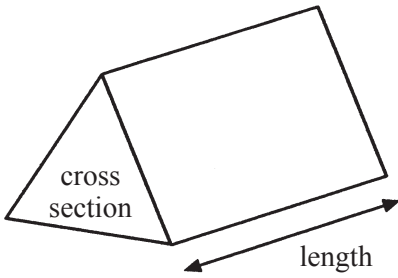
The total mark for this paper is 100.
Figures in brackets printed down the right-hand side of pages indicate the marks awarded to each question or part question.
Functional Elements will be assessed in this paper.
Quality of written communication will be assessed in **question 7**.
You should have a calculator, ruler, compasses and a protractor.
The Formula Sheet is overleaf.



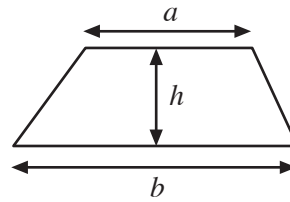
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Formula Sheet

Volume of prism = area of cross section \times length

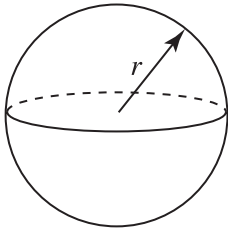


Area of trapezium = $\frac{1}{2}(a+b)h$



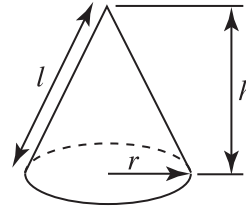
Volume of sphere = $\frac{4}{3}\pi r^3$

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



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

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

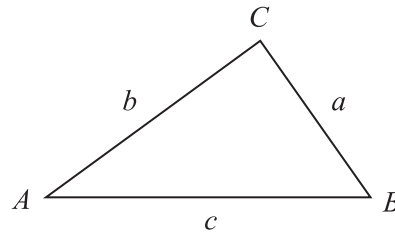


Quadratic Equation

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

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

In any triangle ABC



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.

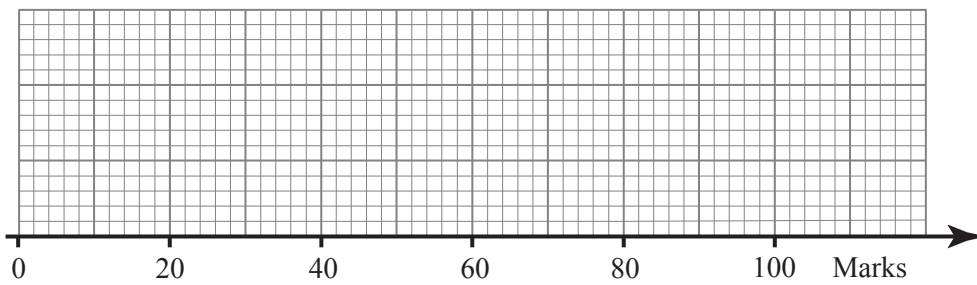
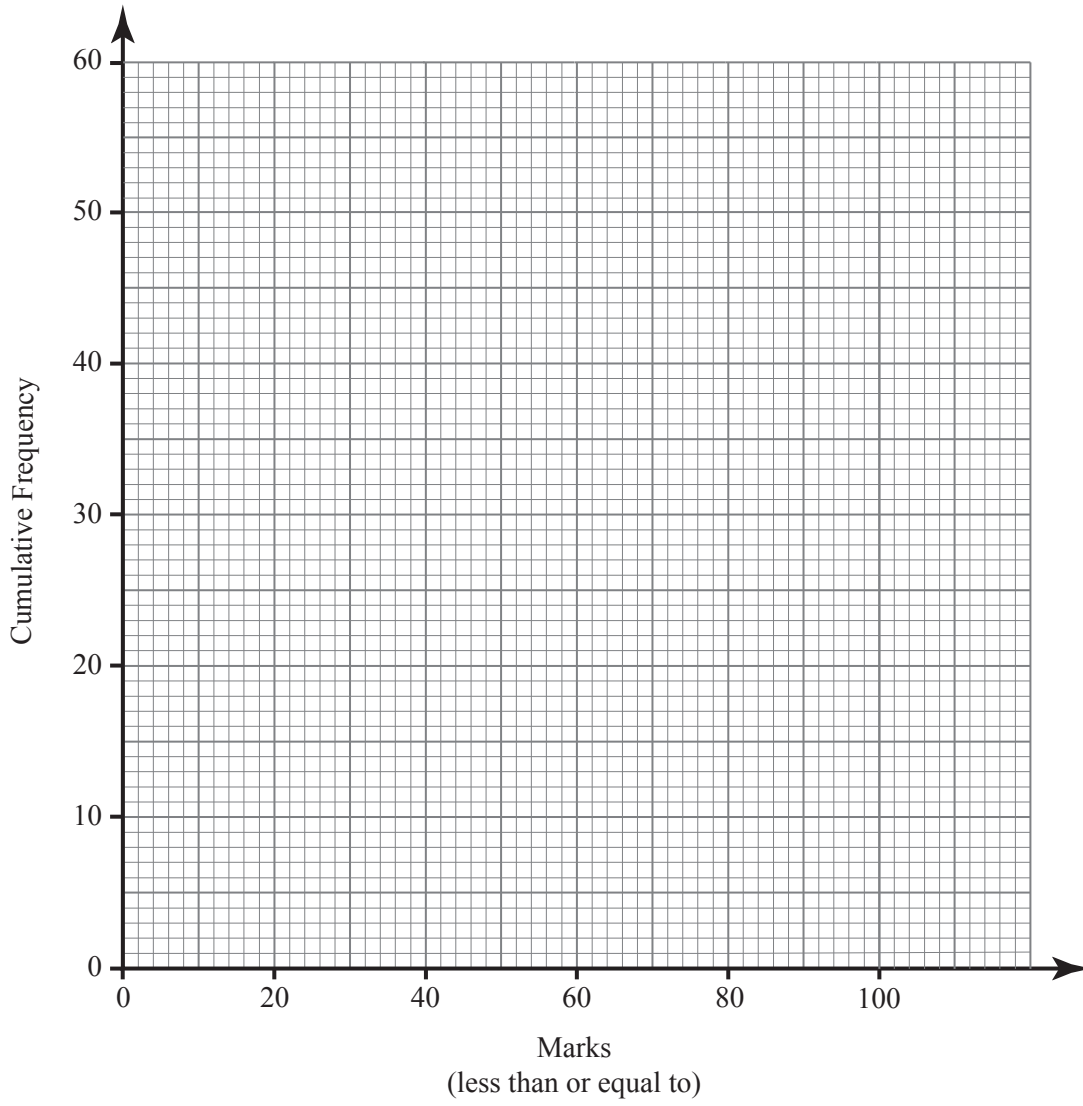
- 1 (a) Jane attends both piano and flute lessons on August 31st.
She attends flute lessons every 8 days and piano lessons every 10 days.
On what date will she next attend both lessons?

Answer _____ [2]

- (b) An electric fire cost £135.66 including VAT at 20%.
How much VAT was payable on the bill?

Answer £ _____ [3]

Examiner Only	
Marks	Remark



Examiner Only	
Marks	Remark

- 3 (a) Solve the simultaneous equations $7x + 3y = 15$
 $4x + 3y = 6$

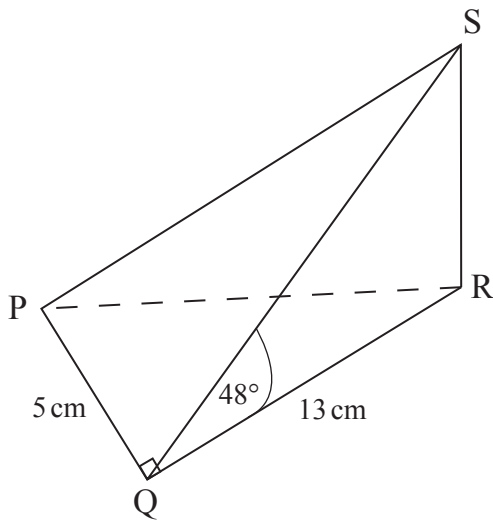
Answer $x =$ _____, $y =$ _____ [2]

- (b) Solve the equation $\frac{4x+1}{12} + \frac{2x-3}{6} = \frac{7}{4}$

Answer $x =$ _____ [4]

Examiner Only	
Marks	Remark

- 4 The diagram shows a pyramid PQRS in which RS is at right angles to the horizontal base PQR. $PQ = 5$ cm, $QR = 13$ cm, angle $PQR = 90^\circ$ and angle $RQS = 48^\circ$.



- (a) Calculate the length SR.

Answer _____ cm [3]

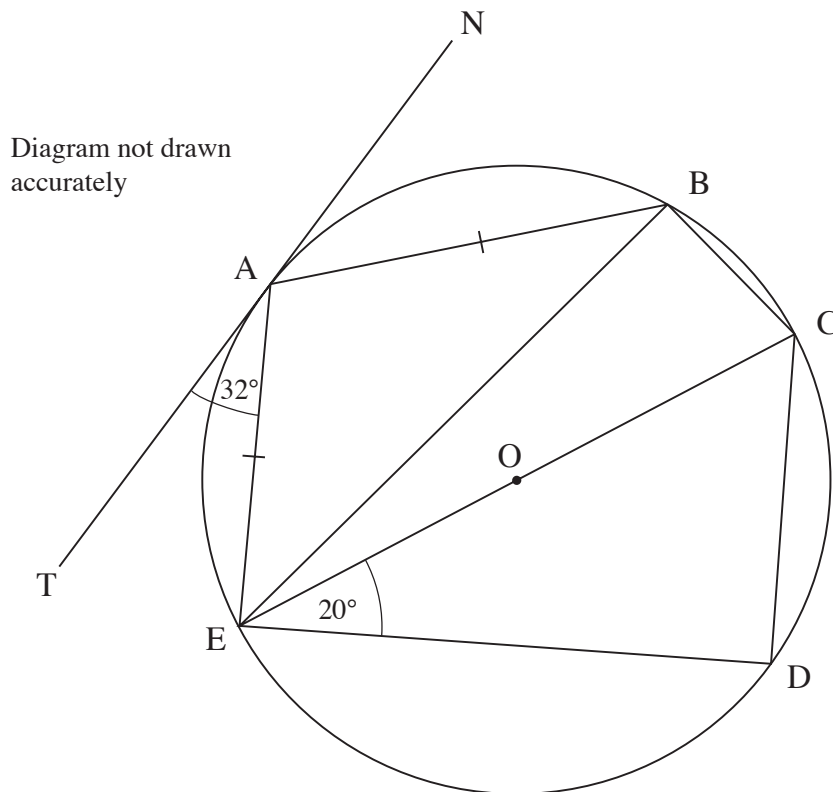
- (b) Calculate the size of angle RPS.

Answer _____ $^\circ$ [3]

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Marks	Remark

6 In the diagram EC is a diameter of the circle and $AE = AB$.

The line TN is the tangent at A.



Given that angle $TAE = 32^\circ$ and angle $CED = 20^\circ$, calculate the size of each of the following:

- (a) Angle $EBC =$ _____ $^\circ$ [1]
- (b) Angle $ABE =$ _____ $^\circ$ [1]
- (c) Angle $BAE =$ _____ $^\circ$ [1]
- (d) Angle $BCE =$ _____ $^\circ$ [1]
- (e) Angle $BED =$ _____ $^\circ$ [1]

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(Questions continue overleaf)

- 13 Martin recorded the length, in minutes, of the films shown on television in one week.

Below is a partially completed frequency table and opposite is a partially completed histogram for his data.

Length in minutes (m)	Frequency
$0 < m \leq 60$	30
$60 < m \leq 80$	
$80 < m \leq 90$	68
$90 < m \leq 100$	96
$100 < m \leq 140$	

- (a) Use the information in the histogram to complete the frequency table. [2]
- (b) Complete the histogram by drawing the missing bars. [2]
- (c) Estimate the number of films whose length is between $\frac{3}{4}$ hour and $1\frac{1}{4}$ hours.

Answer _____ [2]

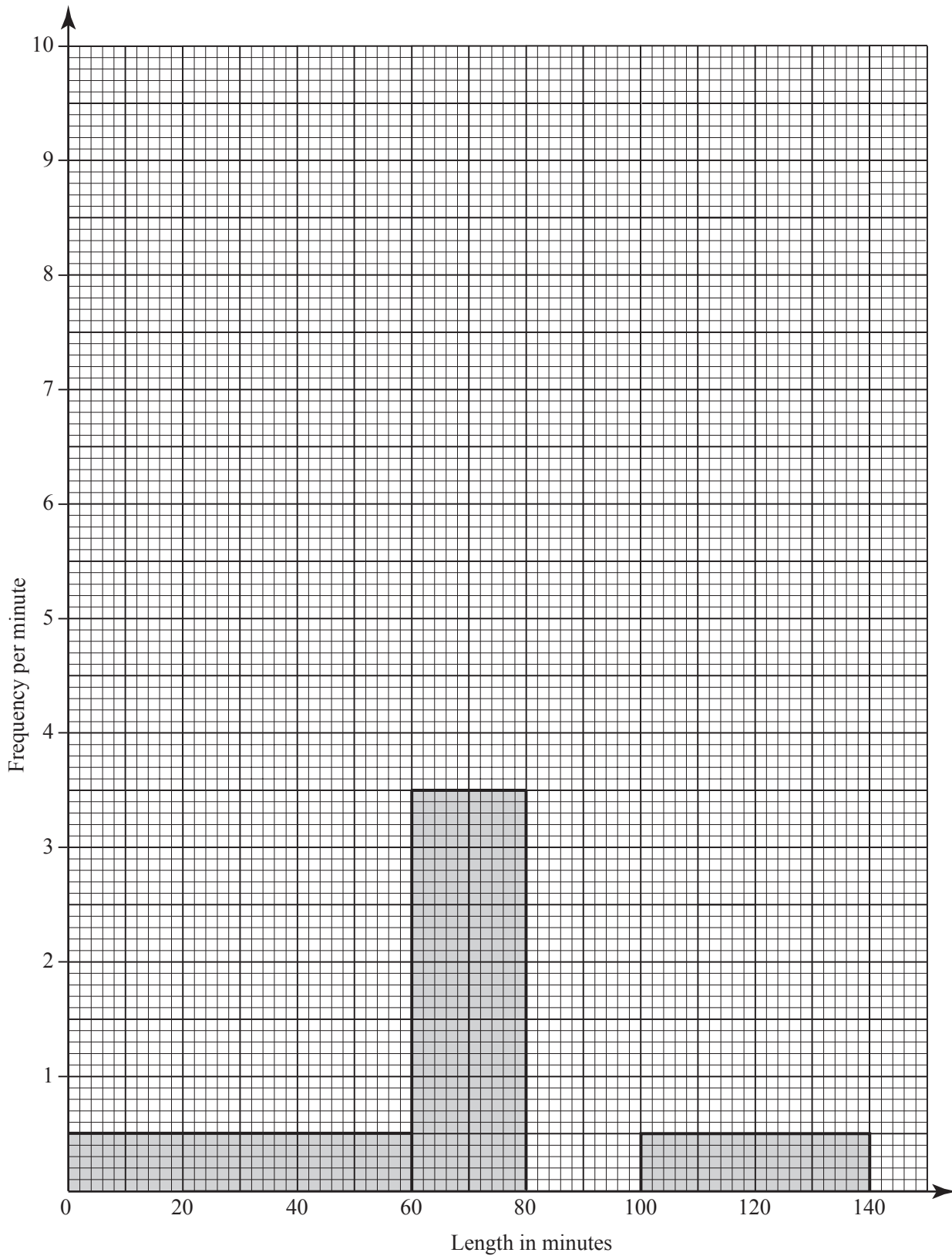
Martin also recorded the lengths, in minutes, of all the films shown on television the following week. He made a new histogram.

Some of his data are given in the table below.

Length in minutes (m)	Frequency	Height of bar (mm)
$60 < m \leq 100$	144	72
$100 < m \leq 160$	x	

- (d) Complete the table by finding the height of the second bar, giving your answer **in terms of x** . [2]

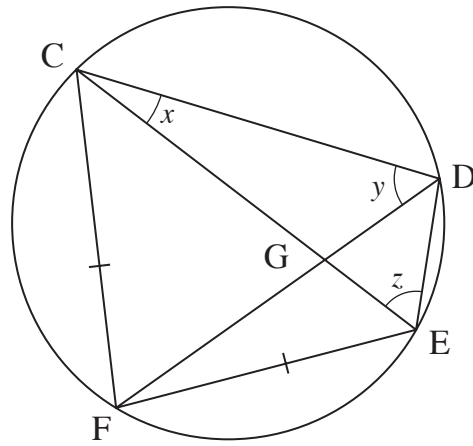
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Marks	Remark



17 Solve $\frac{2}{x+1} + \frac{6}{3x-2} = 1$

Answer $x =$ _____ [7]

Examiner Only	
Marks	Remark



The diagonals CE and DF of a cyclic quadrilateral CDEF intersect at G.

Given that $CF = FE$, prove that $\text{angle } CGD = \text{angle } FED$.

[3]

THIS IS THE END OF THE QUESTION PAPER

Examiner Only	
Marks	Remark

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