Rewarding Learning

Centre Number	
71	

Candidate Number

General Certificate of Secondary Education
January 2012

Mathematics

Module N4 Paper 2
(With calculator)
Higher Tier

[GMN42]

GMN42

WEDNESDAY 11 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 nine** questions.
Any working should be clearly shown in the spaces provided since marks may be awarded for partially correct solutions.

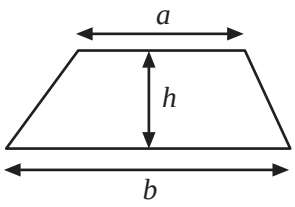
INFORMATION FOR CANDIDATES

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.

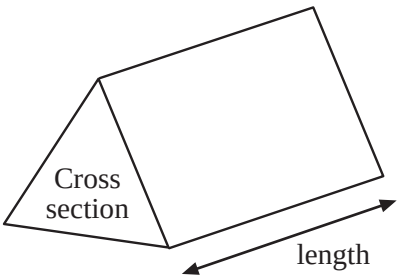
For Examiner's use only	
Question Number	Marks
1	
2	
3	
4	
5	
6	
7	
8	
9	
Total Marks	

Formula Sheet

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



Volume of prism = area of cross section × length

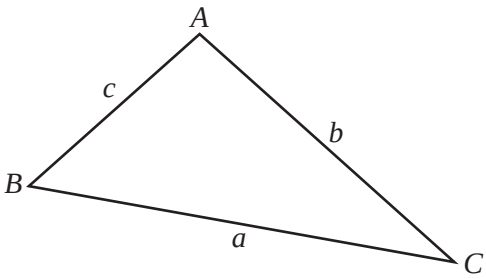


In any triangle *ABC*

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

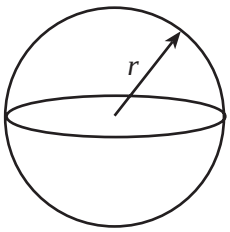
Sine rule : $\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$

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



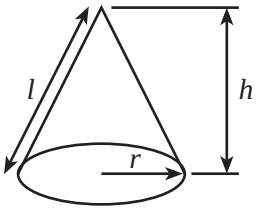
Volume of sphere = $\frac{4}{3}\pi r^3$

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



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

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



Quadratic equation:

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

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

Examiner Only	
Marks	Remark

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]

2 Fifty-five pupils in Year 11 do an end of year French test.

Their data is recorded in the table below.

Mark	0–20	21–40	41–60	61–80	81–100
Frequency	6	17	20	9	3

(a) Complete the cumulative frequency table below.

Mark (less than or equal to)	20	40	60	80	100
Cumulative Frequency	6				

[1]

(b) Draw a cumulative frequency graph opposite to illustrate this information. [3]

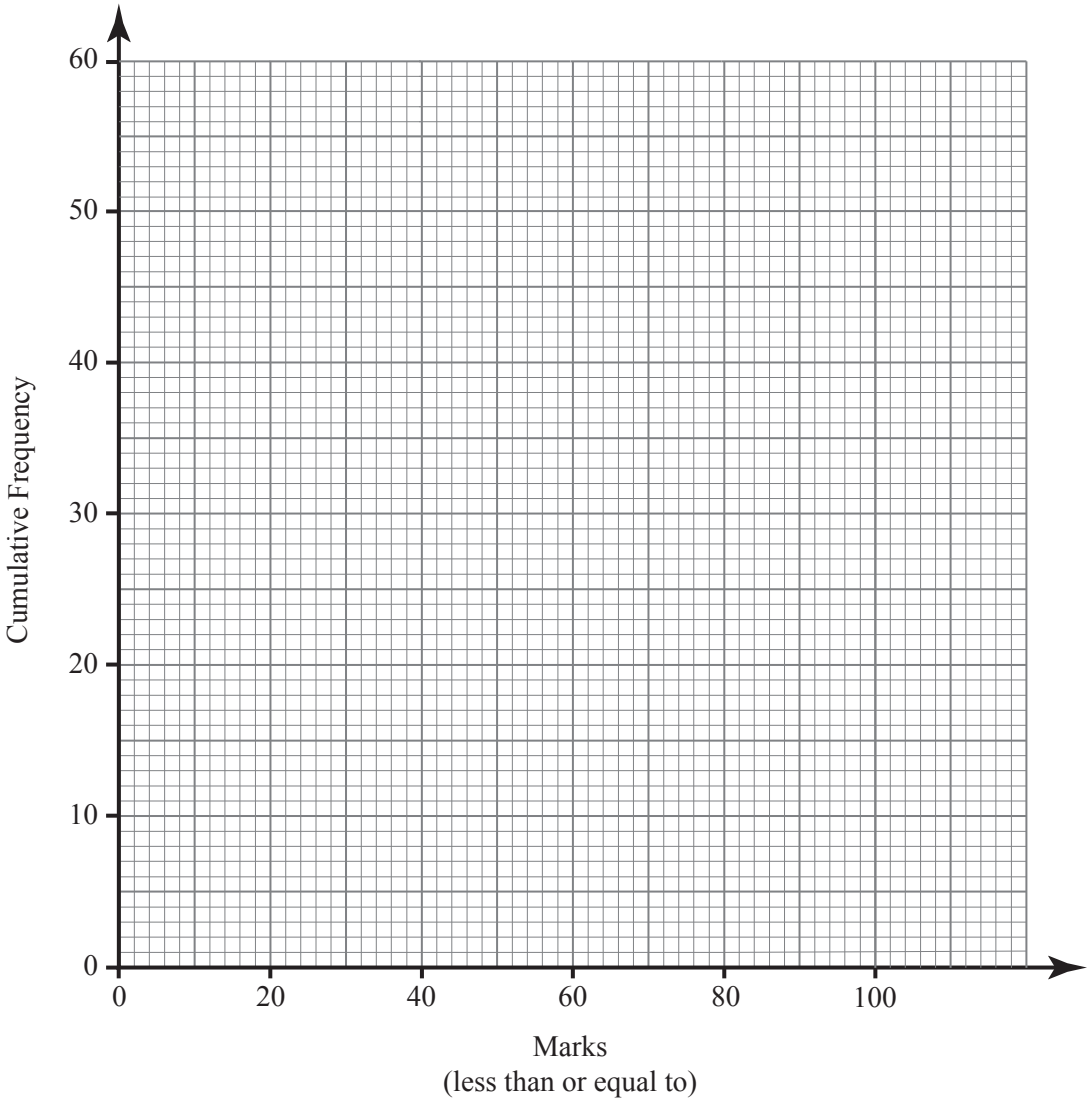
The pass mark for the examination was 52.

(c) Use your graph to estimate the number of students who passed the examination.

Answer _____ [2]

Examiner Only

Marks	Remark



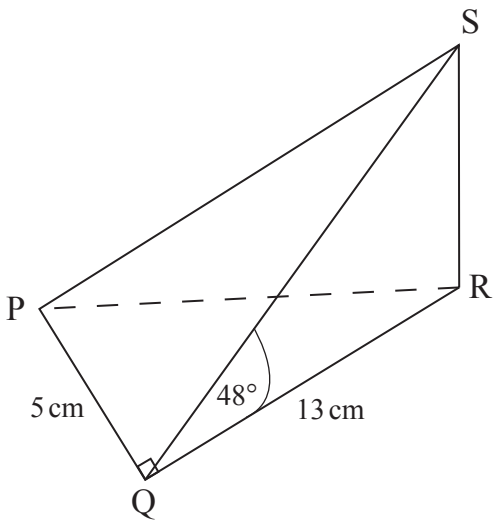
Examiner Only	
Marks	Remark

3 Solve the simultaneous equations $7x + 3y = 15$
$4x + 3y = 6$

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

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° and angle RQS = 48°.



Calculate the length SR.

Answer _____ [4]

5 Expand and simplify $(3p + 2q)(4p - 7q)$.

Answer _____ [3]

6 A field ABCD has straight sides. AB = 80 m.

An underground pipeline crosses the field from B to D and is 264 m long.

Angle ABD = 44°.

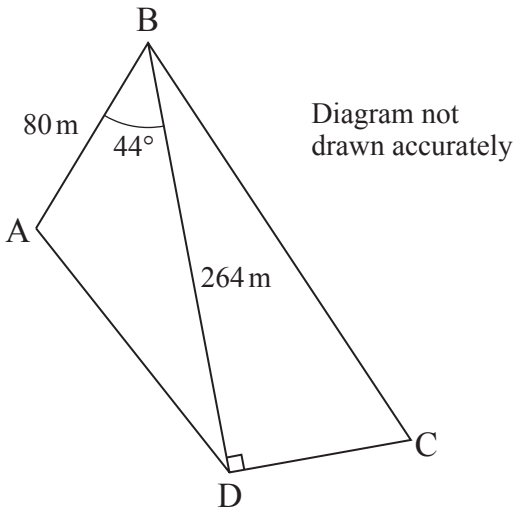


Diagram not drawn accurately

(a) Calculate the area of ABD.

Answer _____ m^2 [2]

A safety shutoff valve is placed at the midpoint of BD.

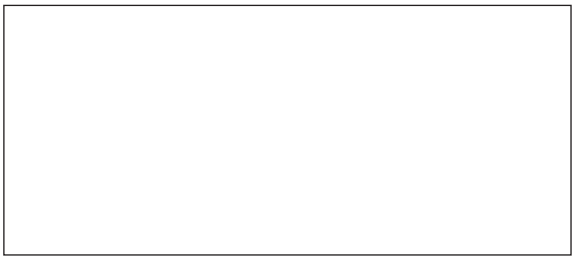
(b) Calculate the distance from the corner A to the valve.

Answer _____ m [3]

Examiner Only

Marks	Remark

7 The length of a rectangle, x, is 5 cm more than the breadth. Its diagonal is 12 cm long.



x

Diagram not drawn accurately

(a) Show that x is a solution of the equation $2x^2 - 10x - 119 = 0$ [3]

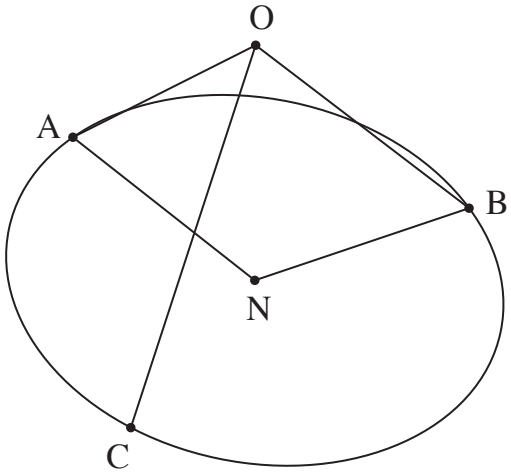
(b) Solve the equation to find the length of the rectangle.

Give your answer correct to 1 decimal place.

Answer $x =$ _____ cm [3]

Examiner Only	
Marks	Remark

8 In a circular circus ring, centre N, three wires OA, OB and OC of **equal** length are attached from A, B, C on the circumference of the ring floor to the top of the tent O. The angles BOC, COA and AOB are each equal to 90° and the angle ANB = 120°. The chords AB, BC and CA are each 25 m in length.



(a) Explain why angle NAB = 30°.

[1]

(b) Calculate the radius of the circus ring.

Answer _____ m [3]

(c) Calculate the length of one of the wires.

Answer _____ m [2]

Examiner Only	
Marks	Remark

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

Answer $x =$ _____ [7]

Examiner Only	
Marks	Remark

THIS IS THE END OF THE QUESTION PAPER

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