Rewarding Learning

Centre Number

71	

Candidate Number

General Certificate of Secondary Education
January 2011

Mathematics

Module N3 Paper 1
(Non-calculator)
Higher Tier

[GMN31]

TUESDAY 11 JANUARY
9.15 am – 10.15 am

GMN31

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 twelve** questions.
Any working should be clearly shown in the spaces provided since marks may be awarded for partially correct solutions.
You **must not** use a calculator for this paper.

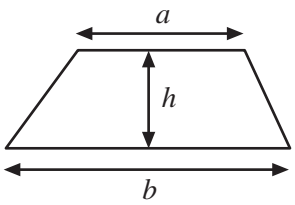
INFORMATION FOR CANDIDATES

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 ruler, compasses, set-square and protractor.
The Formula Sheet is on page 2.

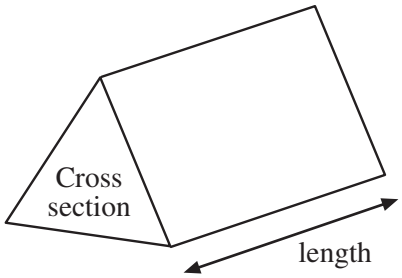
For Examiner's use only	
Question Number	Marks
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	
Total Marks	

Formula Sheet

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



Volume of prism = area of cross section × length

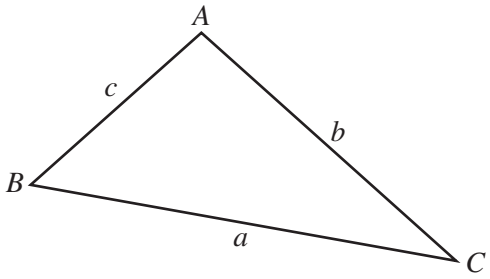


In any triangle *ABC*

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

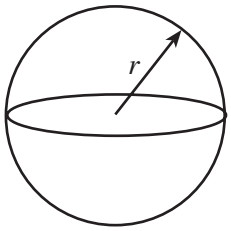
Sine rule : $\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$

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



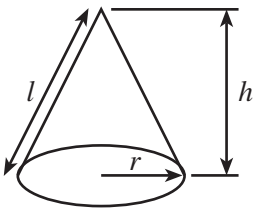
Volume of sphere = $\frac{4}{3}\pi r^3$

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



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

Curved surface area of cone = πrl



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)** VWXYZ is a regular pentagon.

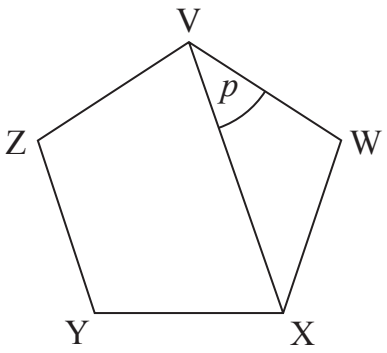


Diagram not drawn accurately

Calculate angle p.
Show your working.

Answer _____ ° [3]

(b) Calculate the size of angle x marked on the signpost.

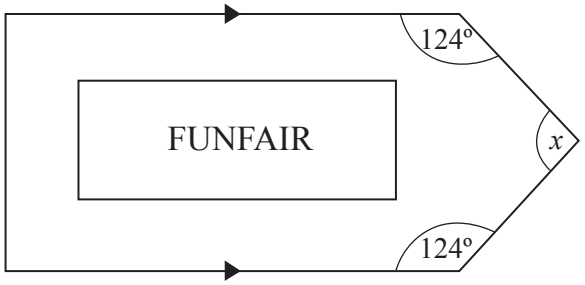


Diagram not drawn accurately

Answer _____ ° [2]

Examiner Only	
Marks	Remark

2 A baker uses $\frac{3}{5}$ of a bag of flour to make 6 muffins.

How many bags of flour will he need to make 48 muffins?

Answer _____ bags [3]

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3 The school bus for Oldtown Secondary School carried a mixture of boys and girls. Some of the students were wearing scarves.

(a) Design a table in the space below which could be used to record the numbers of boys and girls and the numbers of each wearing scarves and not wearing scarves.

[3]

(b) There were 40 students on the bus. Show how they might have been recorded in your table above. [1]

Examiner Only	
Marks	Remark

4 **(a)** Factorise $12 - 8a$

Answer _____ [1]

(b) Solve $18 - 3x = 2 + 5x$

Answer _____ [3]

(c) Solve $\dfrac{21 - 2x}{3} = 5$

Answer _____ [3]

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5 **(a)** Work out $5\frac{3}{4} - 2\frac{5}{6}$

Give your answer as a mixed number.

Answer _____ [3]

(b) Evaluate 2^{-2}

Answer _____ [1]

Examiner Only	
Marks	Remark

6 Convert $0.6\,m^3$ into cm^3

Answer _____ cm^3 [2]

7 Express $\frac{2a}{5} - \frac{a}{4}$ as a single fraction.

Answer _____ [3]

8 The heights of trees in an orchard were recorded. The heights were grouped as shown in the table.

Height h (metres)	Frequency	Mid Point	
$0 < h \leq 2$	12	1	
$2 < h \leq 4$	8	3	
$4 < h \leq 6$	12		
$6 < h \leq 8$	10		
$8 < h \leq 10$	7		
$10 < h \leq 12$	1		

(a) Which class interval contains the median height?

Answer _____ [1]

(b) Complete the table and hence find an estimate for the mean height of the trees.

Answer _____ m [3]

Examiner Only

Marks	Remark

9 A green light flashes every 6 minutes while a red light flashes every 32 minutes.

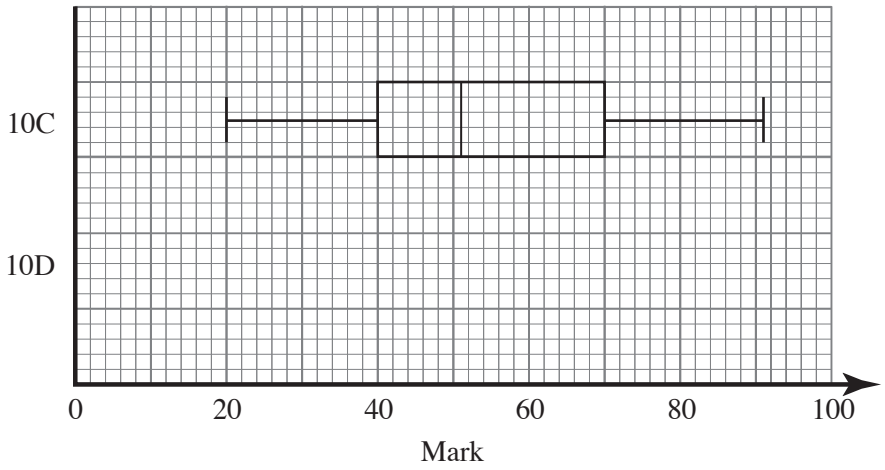
Both lights flash together at 12 noon.

When is the next time that both lights will flash together?

Answer _____ [2]

Examiner Only	
Marks	Remark

10 The box plot shows the marks in a test for class 10C.



(a) Class 10D did the same test and the median mark was 52, the lower quartile was 35, the upper quartile was 82, the lowest mark was 22 and the highest mark was 93.

Draw a box plot for 10D on the grid above. [2]

(b) The head of the mathematics department says that these classes performed similarly in the test. Do you agree with her comment? Give **two** reasons to support your decision.

Answer _____ because _____

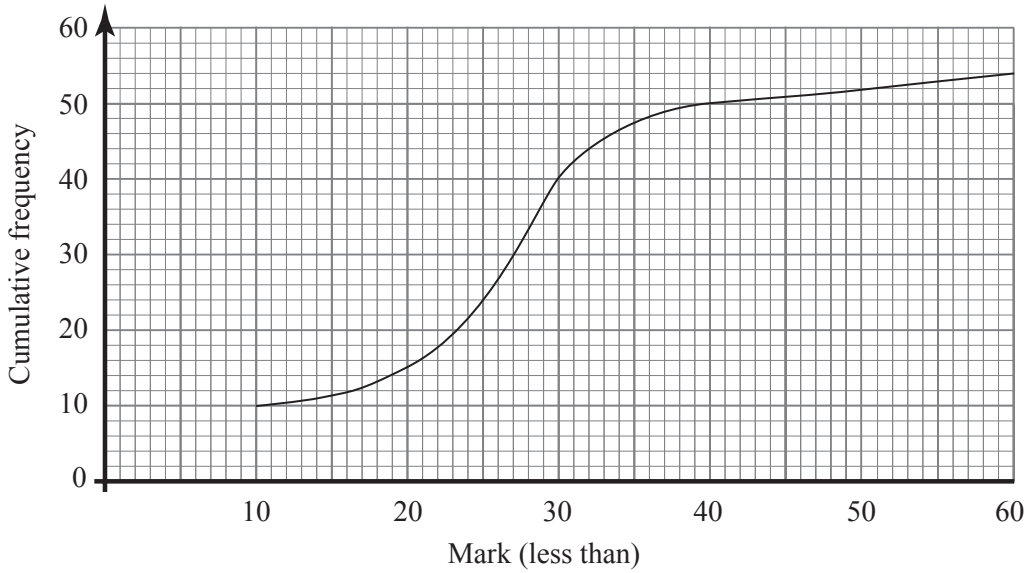
_____

_____ [2]

Examiner Only

Marks	Remark

11



The cumulative frequency graph above illustrates the marks scored by pupils in a Physics test.

(a) Estimate the median mark.

Answer _____ [1]

(b) The pass mark was set at 34. Estimate the number of pupils who passed.

Answer _____ [2]

Examiner Only	
Marks	Remark

Examiner Only	
Marks	Remark

12 The diagram shows a circle with centre O.

A, B and C are three points on the circumference of the circle.

Angle AOC is 130°

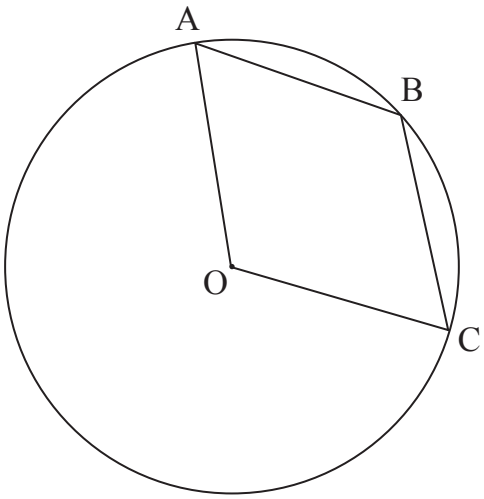


Diagram not drawn accurately.

(a) Explain why angle ABC is 115°

[2]

(b) The lengths AB and OB are equal. Calculate angle OBC.

Answer _____ ° [1]

THIS IS THE END OF THE QUESTION PAPER