Rewarding Learning

Centre Number

71	

Candidate Number

General Certificate of Secondary Education
January 2012

Mathematics

Module N6 Paper 2
(With calculator)
Higher Tier

[GMN62]

MONDAY 16 JANUARY
10.45 am–12.00 pm

GMN62

TIME

1 hour 15 minutes.

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

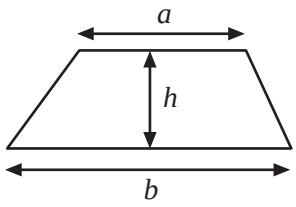
INFORMATION FOR CANDIDATES

The total mark for this paper is 56.
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.

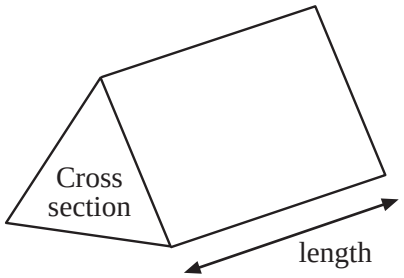
For Examiner's use only	
Question Number	Marks
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	
13	
14	
15	
Total Marks	

Formula Sheet

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



Volume of prism = area of cross section × length

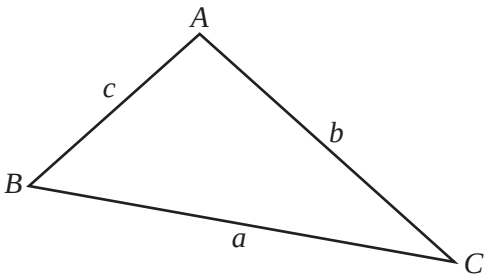


In any triangle *ABC*

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

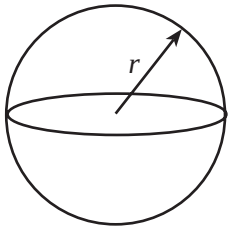
Sine rule : $\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$

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



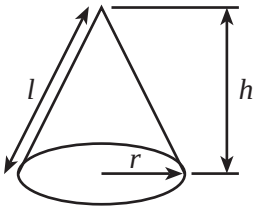
Volume of sphere = $\frac{4}{3}\pi r^3$

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

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

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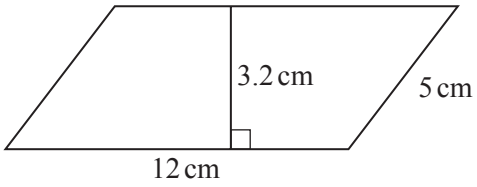
(Questions start overleaf)

Examiner Only	
Marks	Remark

1 **(a)** Calculate the area of the parallelogram.



Answer _____ cm^2 [2]

(b) The area of the trapezium is 40.5 cm^2.

Find the height of the trapezium h.

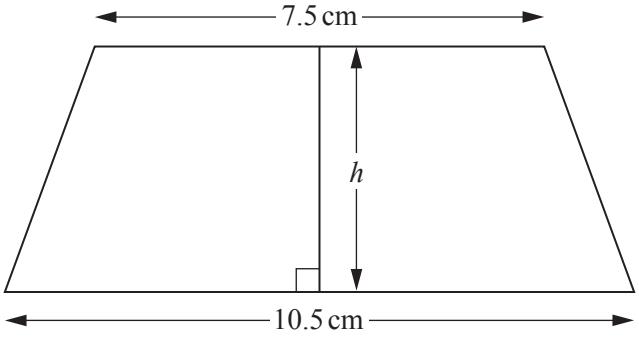
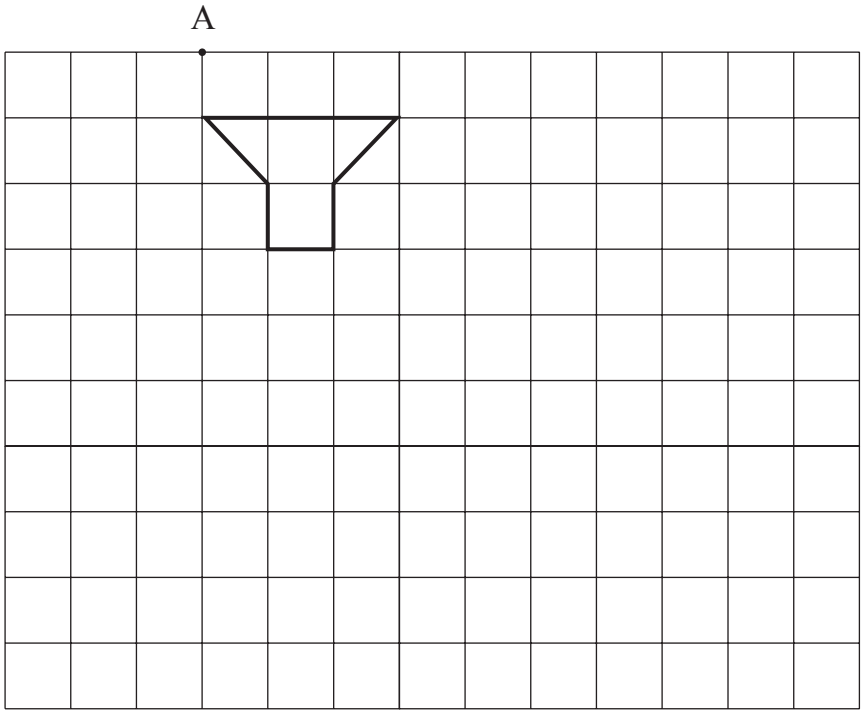


Diagram not drawn accurately

Answer _____ cm [3]

Examiner Only	
Marks	Remark

(c) Draw an enlargement of the shape below using a scale factor of 3 and centre A.



[3]

2 For a credit card balance of £1 758, John must pay 3% or £5, whichever is the larger.

How much must he pay?

Answer £ _____ [2]

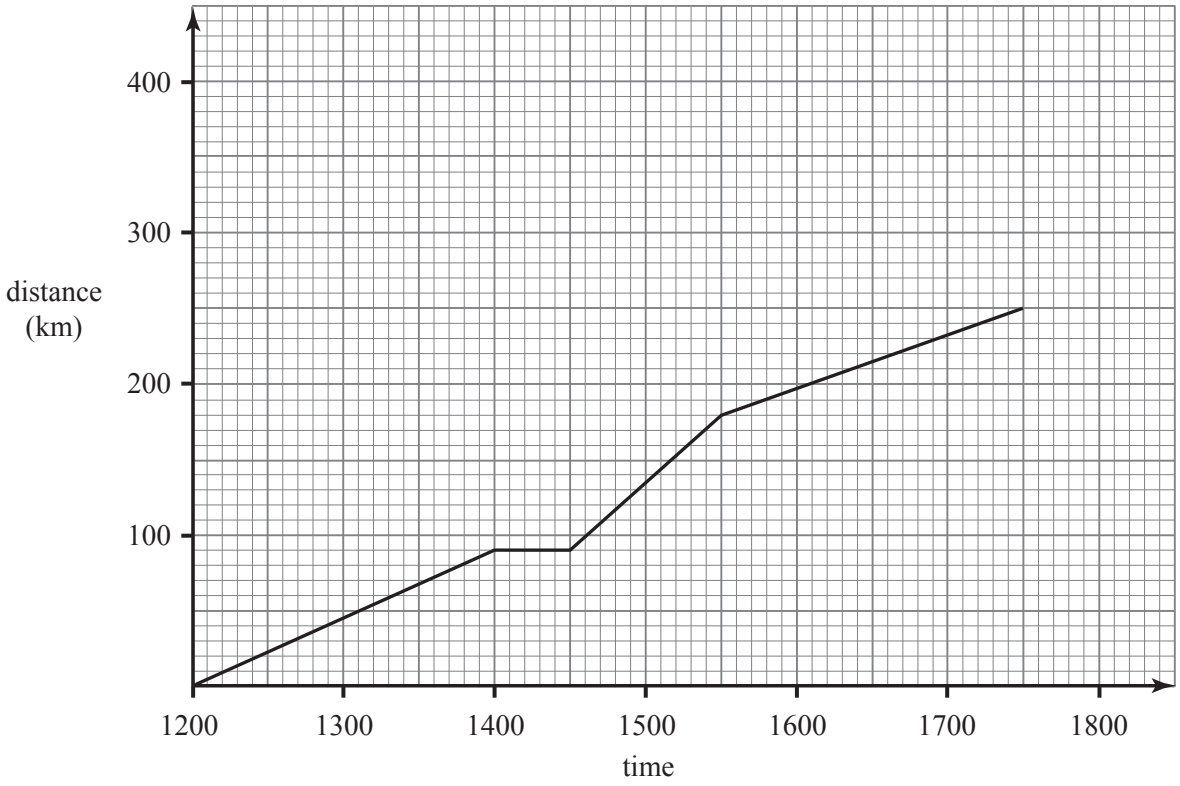
Examiner Only	
Marks	Remark

3 **(a)** Rewrite $5 + y = 11 - x$ to make x the subject.

Answer $x =$ _____ [2]

(b)

Truck driver's distance–time graph



(i) What was the average speed over the first two hours of the journey?

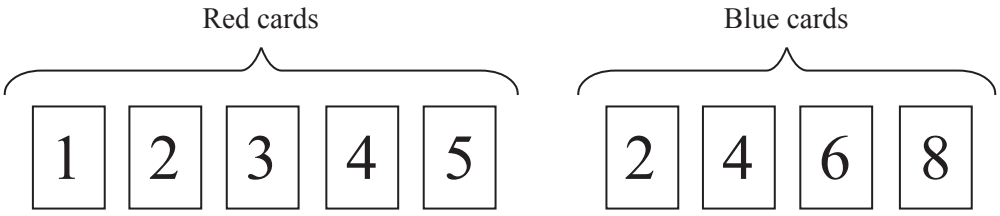
Answer _____ km/hr [2]

(ii) Between which times was the truck driver travelling at the greatest average speed?

Answer _____ to _____ [1]

Examiner Only	
Marks	Remark

4



There are two sets of cards on a table.

Both sets of cards are mixed together and one card is then taken at random.

What is the probability that this card will be a blue card or a card numbered 4 or both?

Answer _____ [2]

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5 Which of "always even", "always odd", "could be odd or even" describes the number $3(5n + 7)$? (n is an integer.)

Explain your answer.

Answer _____ because _____

_____ [2]

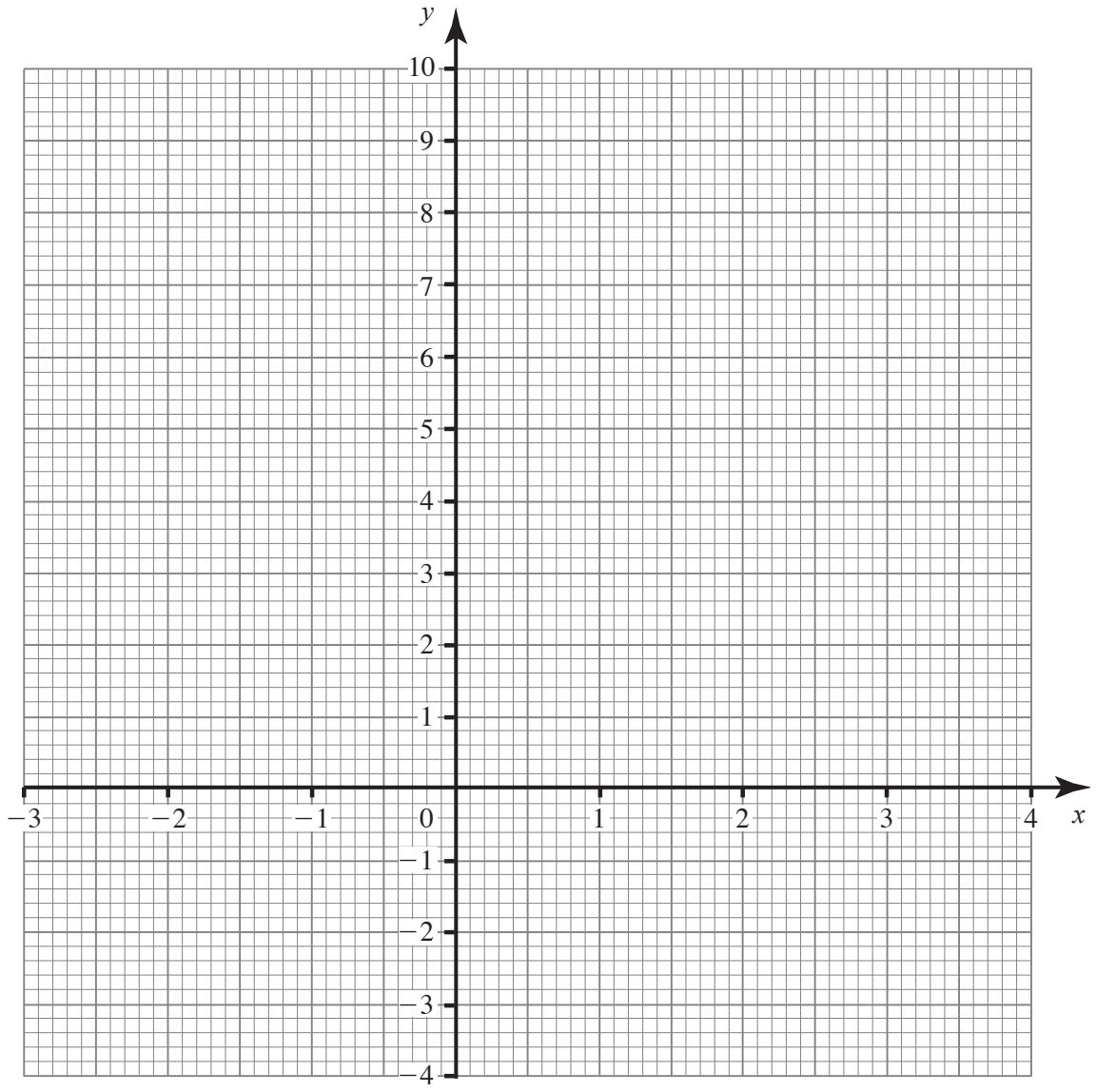
Examiner Only	
Marks	Remark

6 **(a)** Complete the table for $y = 2x^2 - 2x - 3$

x	-2	-1	0	1	2	3
y		1	-3	-3		9

[2]

(b) Draw the graph of $y = 2x^2 - 2x - 3$ for $x = -2$ to $x = 3$ on the grid.



[2]

(c) Draw the line $y = 3$ and find the x values of the points of intersection of the curve and the line.

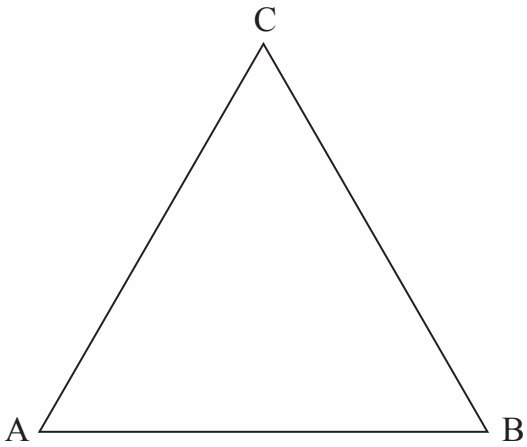
Answer _____ [2]

(d) Write down the equation in x with solutions as found in **(c)**.

Answer _____ [1]

Examiner Only	
Marks	Remark

7 ABC is a triangle.



(a) Use a ruler and compasses to construct the bisector of the angle ABC. [2]

(b) Shade the region inside the triangle which is more than 3 cm from B and closer to the side BC than to the side AB. [2]

8 Rebecca has a fair six-sided dice.

She throws it twice and adds both scores together.

(a) List the ways Rebecca can get a total of 7

Answer _____ [1]

(b) What is the probability that her total score will be 12?

Answer _____ [2]

Examiner Only	
Marks	Remark

9 Peter and Paul share a sum of money in the ratio 5 : 4

Peter gets £16 more than Paul.

How much money is shared between the boys?

Answer £ _____ [3]

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10 A grain of sand weighs 0.0005 g.

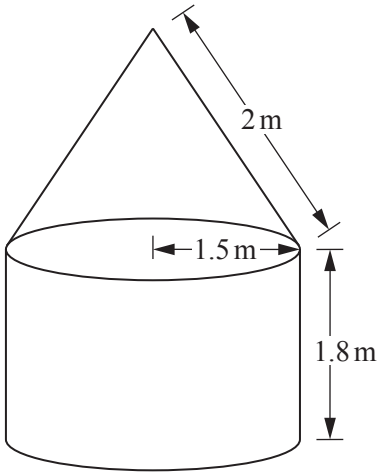
How many grains of sand would there be in a bag containing 7.2 kg of sand?

Give your answer in standard form.

Answer _____ [2]

Examiner Only	
Marks	Remark

11



A canvas tent has a cylindrical wall 1.8 m high and base radius 1.5 m.

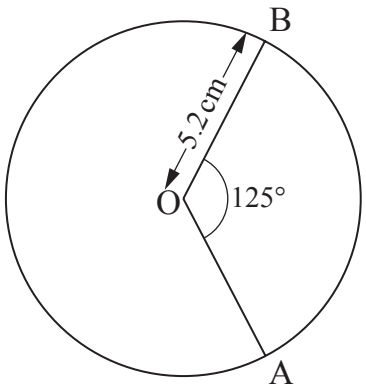
The roof is cone shaped with a slant height 2 m.

Calculate the total area of canvas forming the wall and the roof of the tent.

Give your answer correct to 3 significant figures.

Answer _____ m^2 [4]

12



In the circle centre O, the radius is 5.2 cm. The marked angle AOB is 125°.

Calculate the length of the **major arc** AB.

Give your answer to an appropriate degree of accuracy.

Answer _____ cm [4]

Examiner Only	
Marks	Remark

13 Rationalise the denominator of $\frac{5}{\sqrt{10}}$ and simplify your answer.

Answer _____ [2]

14 A bag contains 7 blue stones and 2 green stones.

Zara takes 2 stones at random, without replacement, from the bag.

Then Norah takes 2 stones at random, without replacement, from the bag.

What is the probability that Zara and Norah both have one stone of each colour?

Answer _____ [4]

15 A solid cone of radius r and perpendicular height h has the same **total** surface area as a sphere of radius r. Find an expression for h in terms of r.

Examiner Only	
Marks	Remark

Answer $h =$ _____ [4]

THIS IS THE END OF THE QUESTION PAPER

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