Rewarding Learning

Centre Number	
71	

Candidate Number

General Certificate of Secondary Education

2009

Mathematics

Module N6 Paper 2
(With calculator)
Higher Tier

[GMN62]

GMN62

MONDAY 1 JUNE

10.45 am – 12.00 noon

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

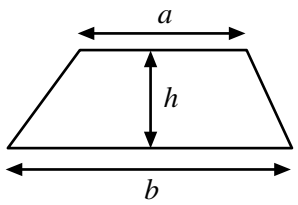
INFORMATION FOR CANDIDATES

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.

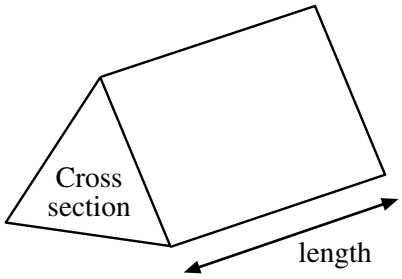
For Examiner's use only	
Question Number	**Marks**
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	
13	
14	
15	
16	
Total Marks	

Formula Sheet

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



Volume of prism = area of cross section × length

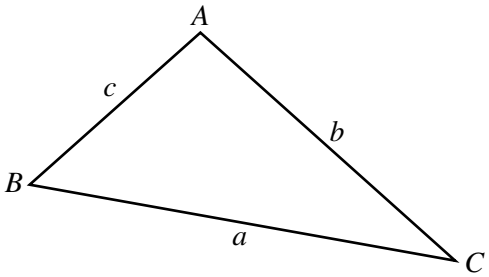


In any triangle ABC

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

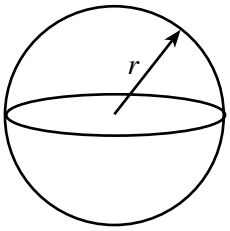
Sine rule : $\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$

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



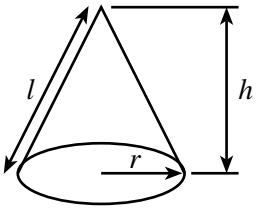
Volume of sphere = $\frac{4}{3}\pi r^3$

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 bag of 25 potatoes selected at random in a store has 4 bad potatoes. How many potatoes are expected to be bad out of a bag of 200 potatoes?

Answer _____ [2]

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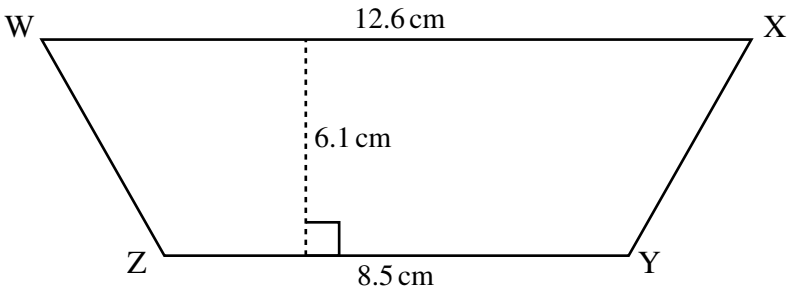
2 WXYZ is a trapezium.



Calculate the area of the trapezium.
Give your answer to an appropriate degree of accuracy.

Answer _____ cm^2 [3]

Examiner Only	
Marks	Remark

3 **(a)** To feed 30 people John makes

20 beef sandwiches
36 cheese sandwiches
52 ham sandwiches

How many of each would he need to make for 45 people?

Answer _____ beef

Answer _____ cheese

Answer _____ ham

[3]

(b) £1 = $2 and $5 = €3

Which is cheaper, a camera bought for £36 or another bought for €42?
Show your working.

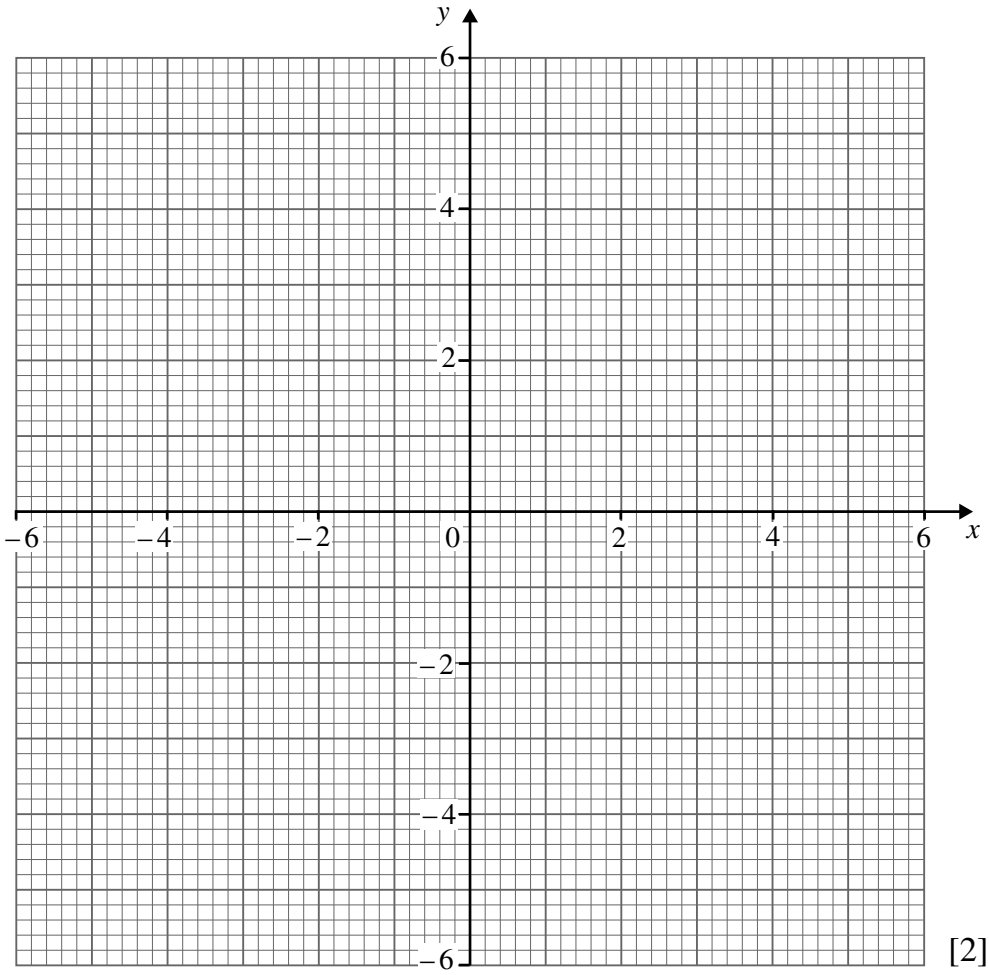
Answer: The camera bought for _____ [2]

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

x	–3	–2	–1	0	1	2
y	6		–2	–3		1

[2]

(b) Hence draw the graph of $y = x^2 - 3$



[2]

Examiner Only

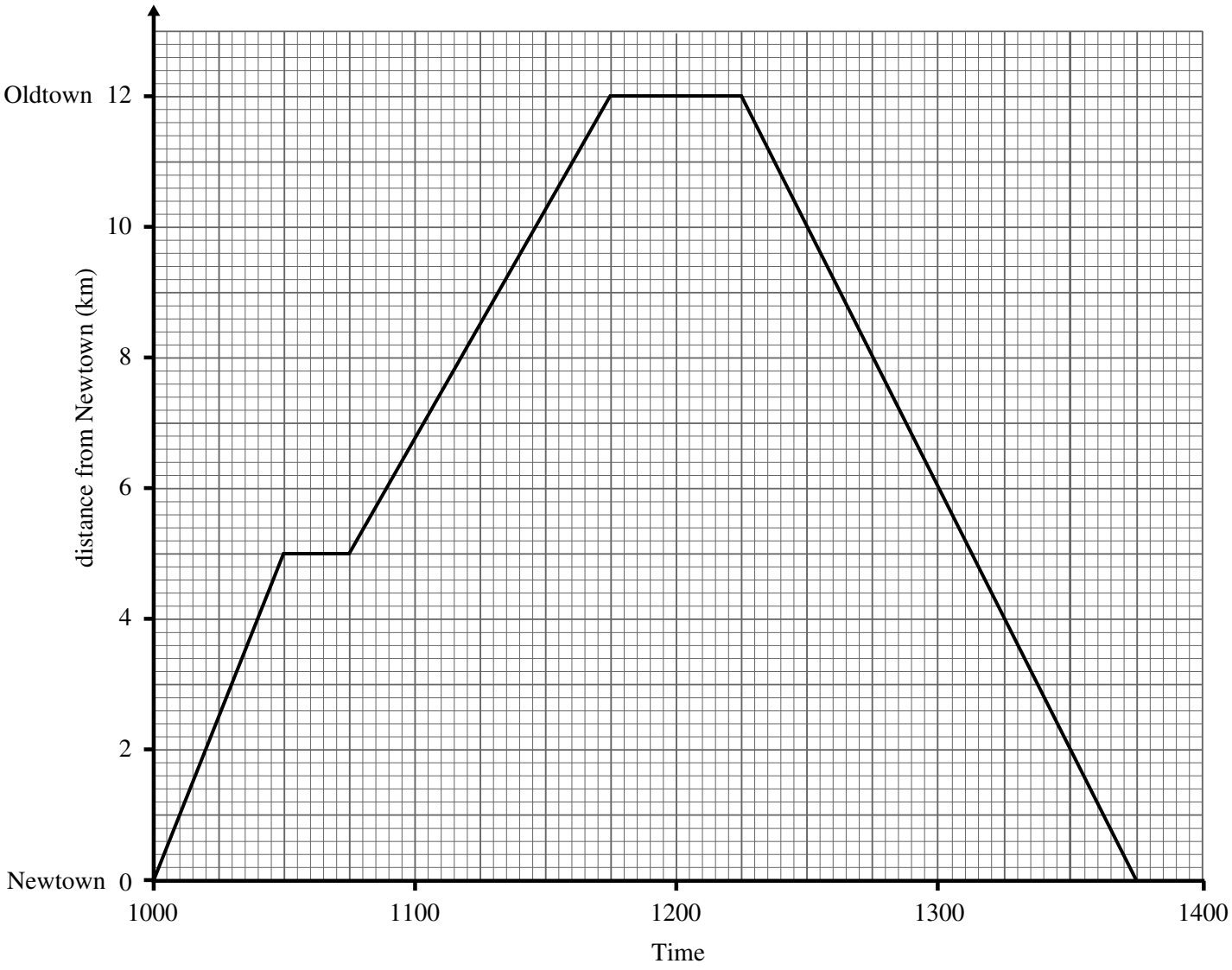
Marks	Remark

5 A piece of metal has a volume of 600 cm^3 and weighs 2700 g. Calculate its density.

Answer _____ g/cm^3 [2]

Examiner Only	
Marks	Remark

6 An athlete goes for a run from Newtown to Oldtown and back. His journey is illustrated on the graph.



Examiner Only	
Marks	Remark

(a) What is the athlete's speed on the return journey from Oldtown to Newtown?

Answer _____ km/hr [2]

(b) A second athlete leaves Oldtown at 1030 and runs towards Newtown, at a speed of 7 km/hr.

(i) Illustrate his journey on the graph above. [3]

(ii) At what time do the two athletes pass each other?

Answer _____ [1]

[Turn over

Examiner Only	
Marks	Remark

7 In Westwood School there are 550 girls and 450 boys. The probability that a girl plays the piano is 0.3 and the probability that a boy plays the piano is 0.18

How many pupils at Westwood School play the piano?

Answer _____ [4]

---

8 £180 is divided between Lisa, Mikey and Richard in the ratio 8:1:6
How much does each get?

Answer £ _____ Lisa

Answer £ _____ Mikey

Answer £ _____ Richard [3]

---

9 Simplify

(a) $t^3 \times t^3$

Answer _____ [1]

(b) $r^6 \div r^2$

Answer _____ [1]

(c) $4x^{-1}y^3 \times 2x^2y$

Answer _____ [2]

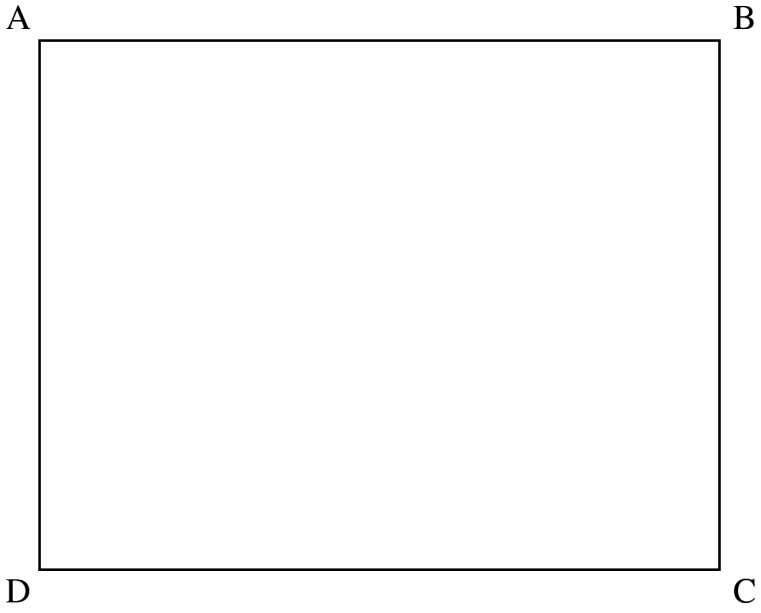
10 Calculate the surface area of a sphere of radius 9 cm.

Examiner Only

Marks	Remark

Answer _____ cm^2 [2]

11



(a) Draw the locus of points that are the same distance from C as from D. [2]

(b) Shade the region inside the rectangle which is less than 6 cm from A and closer to C than to D. [2]

Examiner Only	
Marks	Remark

12 h, l and r represent lengths.
Complete the table below indicating whether the expressions could represent

length area volume none of these

$\frac{3\pi r^2 h}{2rl}$	$\frac{\pi rlh}{r^3}$	$4\pi r^2(l + h)$	$(l + r)(h - r)$

[3]

13 Make r the subject of the formula $p = \frac{50(q+r)}{r}$.

Answer r = _____ [4]

14 The diagram shows a sector of a circle, radius 20 cm. Angle AOB = 144 °

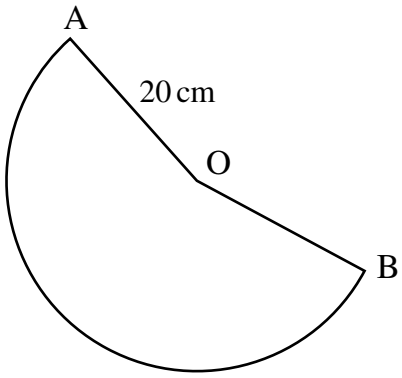
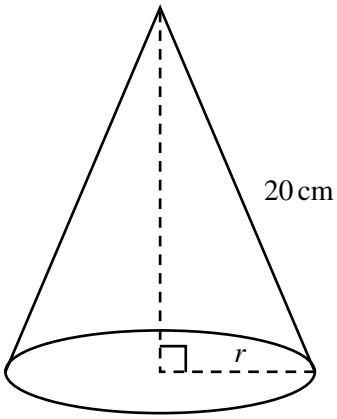


Diagram not drawn accurately

(a) Find, in terms of π, the arc length of the sector.

Answer _____ cm [3]

The straight edges of the sector are joined together to form a cone with slant height 20 cm as shown below.



(b) Find the radius, *r*, of the base of the cone.

Answer _____ cm [2]

Examiner Only

Marks	Remark

Examiner Only	
Marks	Remark

15 Given that $y = x^2 - 6x + 4$ can be written as $y = (x - 3)^2 - 5$, write down the coordinates of the minimum point on the graph of $y = x^2 - 6x + 4$

Answer _____ [2]

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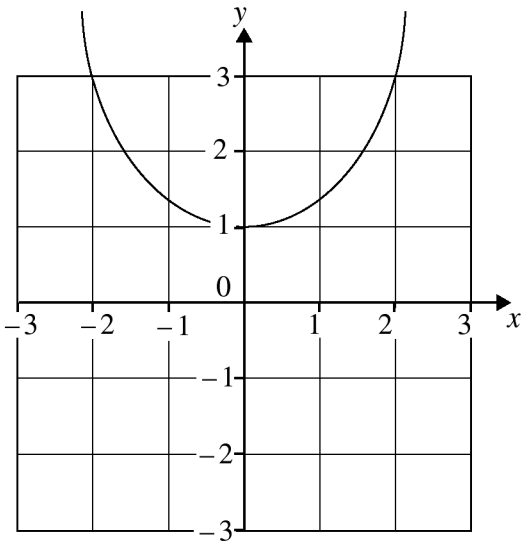
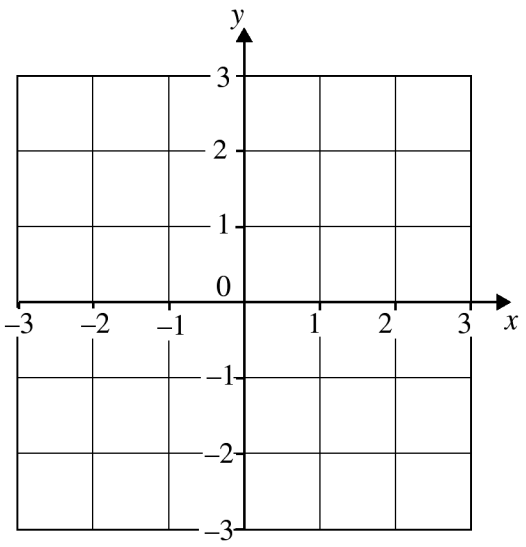
16 The grid shows a sketch of a function $y = f(x)$.

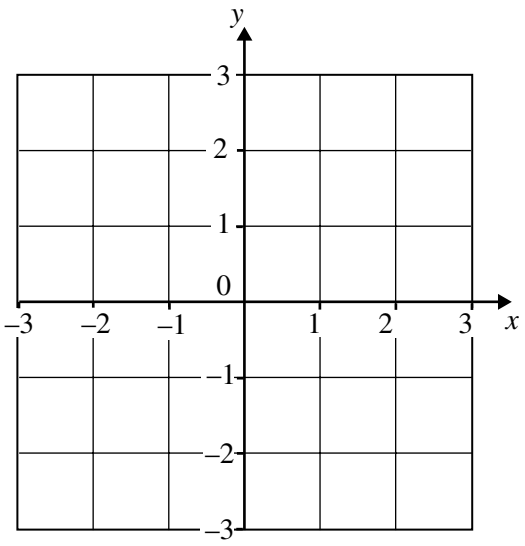


(a) Sketch the function $y = -f(x)$



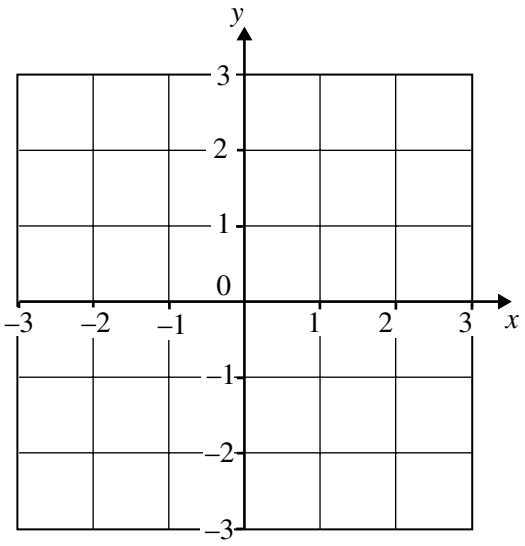
[1]

(b) Sketch the function $y = f(3x)$



[1]

(c) Sketch the function $y = f(x) - 3$



[1]

Examiner Only	
Marks	Remark

THIS IS THE END OF THE QUESTION PAPER