Rewarding Learning

Centre Number

71	

Candidate Number

General Certificate of Secondary Education
January 2010

Mathematics

Module N6 Paper 2
(With calculator)
Higher Tier

[GMN62]

GMN62

FRIDAY 15 JANUARY

10.45 am – 12.00 pm

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	

TIME

1 hour 15 minutes.

INSTRUCTIONS TO CANDIDATES

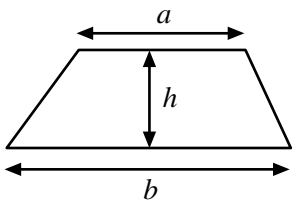
Write your Centre Number and Candidate Number in the spaces provided at the top of this page.
Write your answers in the spaces provided in this question paper.
Answer **all sixteen** questions.
Any working should be clearly shown in the spaces provided since marks may be awarded for partially correct solutions.

INFORMATION FOR CANDIDATES

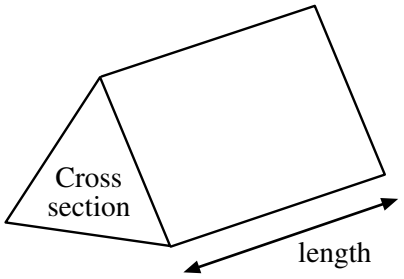
The total mark for this paper is 56.
Figures in brackets printed down the right-hand side of pages indicate the marks awarded to each question or part question.
You should have a calculator, ruler, compasses, set-square and protractor.
The Formula Sheet is on page 2.

Formula Sheet

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



Volume of prism = area of cross section × length

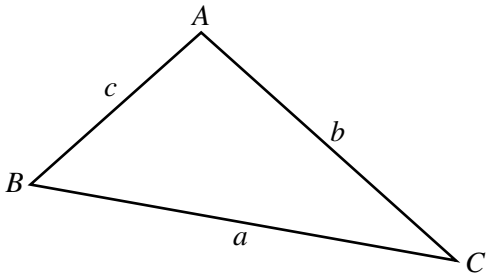


In any triangle *ABC*

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

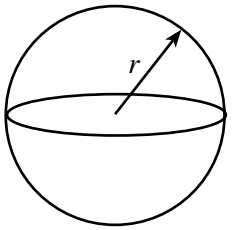
Sine rule : $\dfrac{a}{\sin A} = \dfrac{b}{\sin B} = \dfrac{c}{\sin C}$

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



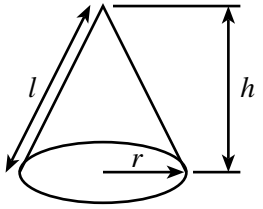
Volume of sphere = $\frac{4}{3}\pi r^3$

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



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

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



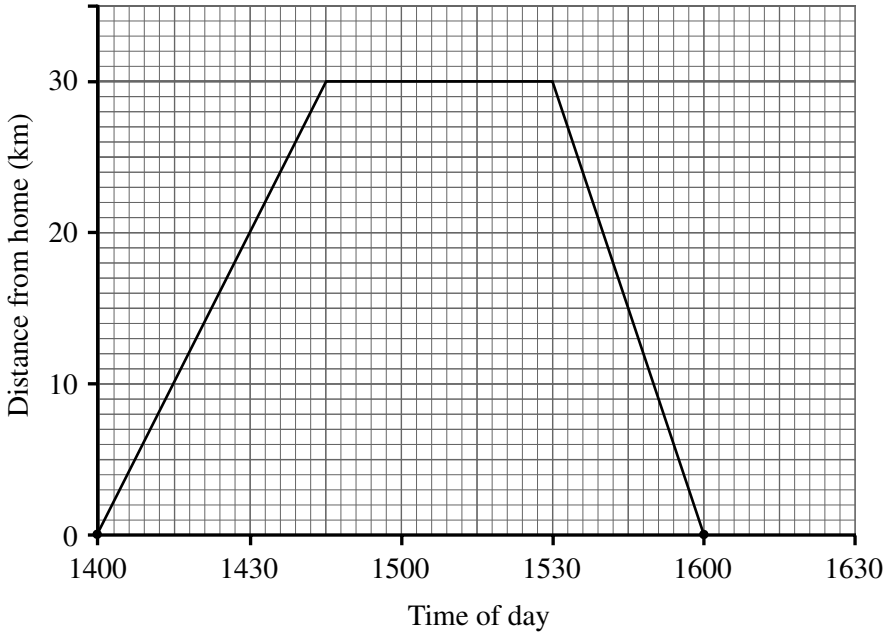
Quadratic equation:

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 Jim drove from his home to the airport to collect his daughter.
He waited for her to arrive and then he drove home.
Here is a distance–time graph for Jim's complete journey.



(a) Work out Jim's average speed on his journey home from the airport, giving your answer in kilometres per hour.

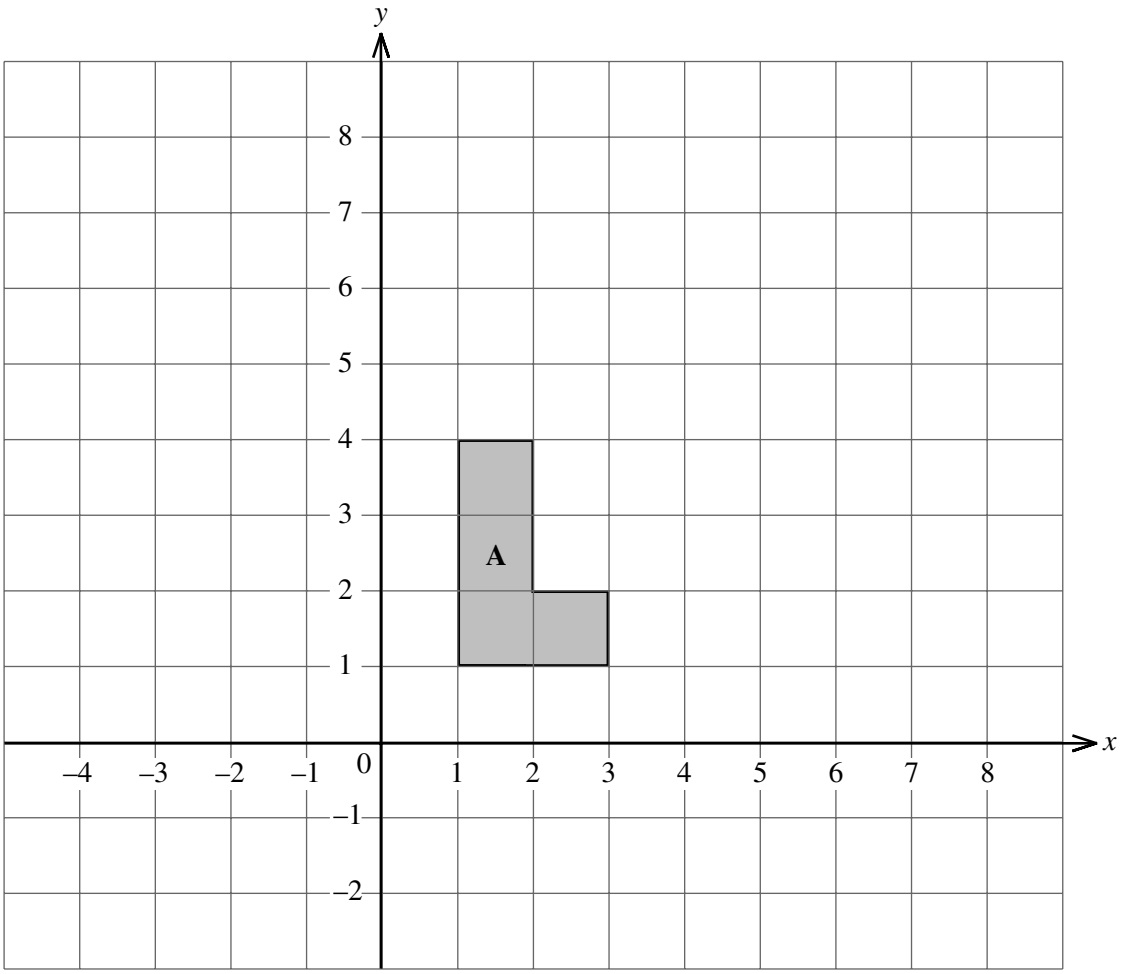
Answer _____ km/h [2]

(b) Between what two times was he travelling at his fastest average speed?

Answer between _____ and _____ [1]

Examiner Only	
Marks	Remark

2 Enlarge the shape A, by scale factor 2, from the centre C (–1, 2).



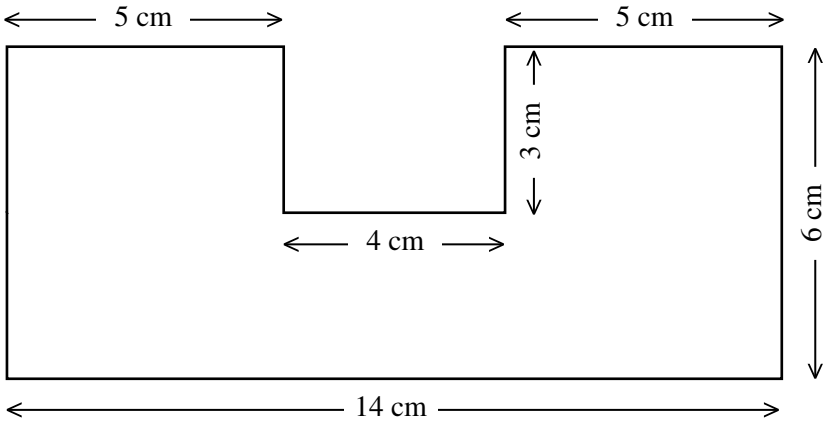
[3]

3 96p is shared in the ratio 5 : 1
Calculate each share.

Answer _____ p, _____ p [2]

Examiner Only	
Marks	Remark

4 **(a)**



For the shape above calculate

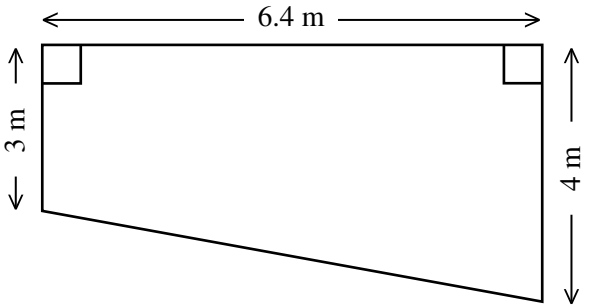
(i) the perimeter,

Answer _____ cm [1]

(ii) the area.

Answer _____ cm^2 [2]

(b) Calculate the area of the trapezium.



Answer _____ m^2 [2]

Examiner Only	
Marks	Remark

5 Which of "always odd", "always even", "could be odd or even" describes the number $5n - 1$? (n is an integer.)

Explain your answer.

Answer _____

because _____

_____ [2]

---

6 Kim always buys one of the following items from the shop when she visits the cinema. The table shows some of the probabilities for the item she buys.

Item	Crisps	Drink	Popcorn	Ice-cream	Chocolate
Probability	0.18		0.3	0.28	0.02

(a) What is the probability that she buys a drink?

Answer _____ [2]

(b) What is the probability that she buys crisps or popcorn?

Answer _____ [2]

7

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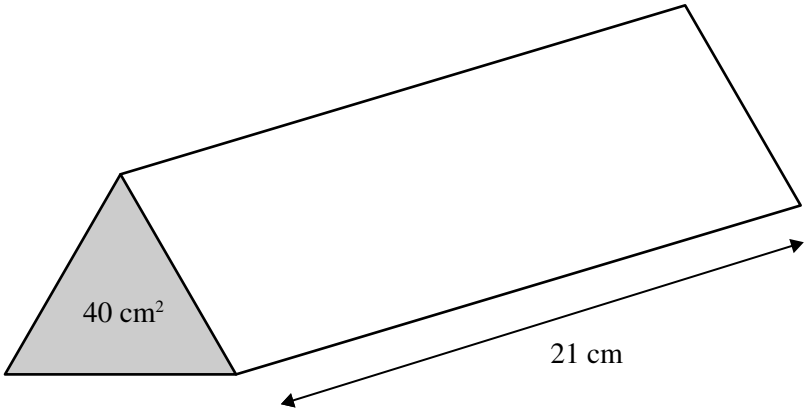
A cruise ship carries fuel in three tanks whose capacities are in the ratio 3 : 5 : 6
The capacity of the smallest tank is 162 000 gallons. Calculate the total capacity of the three tanks.

Answer _____ gallons [2]

Examiner Only	
Marks	Remark

8 **(a)** A solid triangular prism of mass 7900 g has a cross-section area of 40 cm^2 and length 21 cm.



Calculate the density of the prism.

Give your answer to an appropriate degree of accuracy.

Answer _____ g/cm^3 [4]

(b) How many planes of symmetry has the prism in **(a)** if

(i) the triangular face is equilateral,

Answer _____ [1]

(ii) the triangular face is isosceles?

Answer _____ [1]

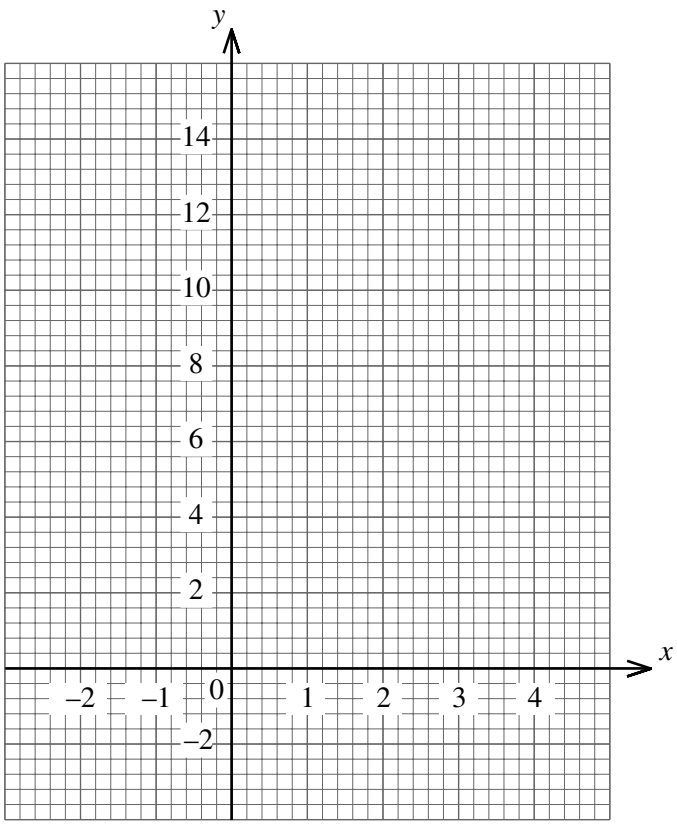
Examiner Only	
Marks	Remark

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

x	–2	–1	0	1	2	3
y	14		0	–1		9

[2]

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



[2]

(c) Draw the line $y = 8$ on the grid above and find the x co-ordinates of the points of intersection of the line with the graph of $y = 2x^2 - 3x$

Answer $x =$ _____ and $x =$ _____ [2]

(d) Write down the equation in x whose solutions are the x-values found in part **(c)**.

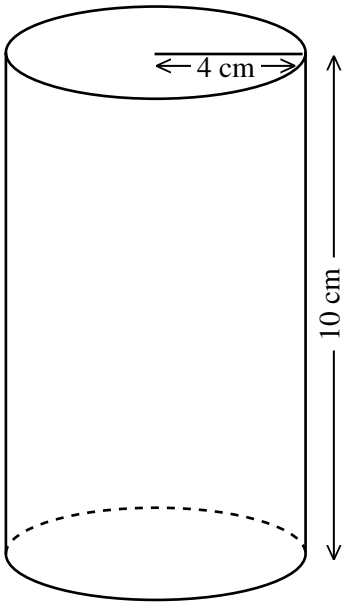
Answer _____ [1]

10 Solve the inequality $9 - 3x \geqslant 1 - 7x$

Examiner Only | Marks | Remark

Answer _____ [2]

11 Find the curved surface area of a cylinder with radius 4 cm and height 10 cm.



Answer _____ cm^2 [2]

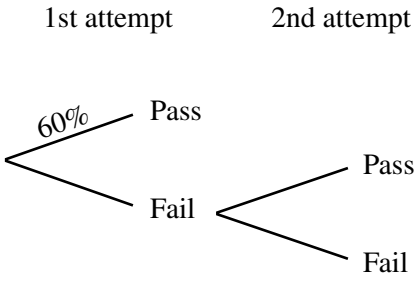
12 The star Betelgeuse has a diameter of 610 million miles.
Its diameter is approximately 700 times bigger than the Sun's diameter.
Calculate the diameter of the Sun giving your answer in standard form.

Answer _____ miles [2]

Examiner Only	
Marks	Remark

13 The probability of a student passing their driving test on the first attempt is 60%.
The probability of a student passing their driving test on the second attempt is 75%.

(a) Complete the tree diagram to show all possible outcomes



[2]

(b) Calculate the probability that a student will take no more than two attempts to pass their test.

Answer _____ [3]

14 t is inversely proportional to w and $t = 27$ when $w = 12$

Find the value of t when $w = t$.

Answer t = _____ [2]

Examiner Only	
Marks	Remark

15 Solve the equation

$$\sqrt{(x-9)} = 5 - \sqrt{x}$$

Show all working.

Answer $x =$ _____ [3]

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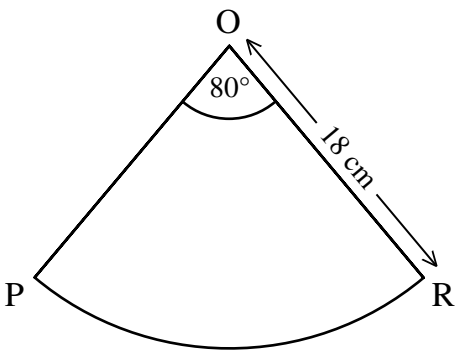
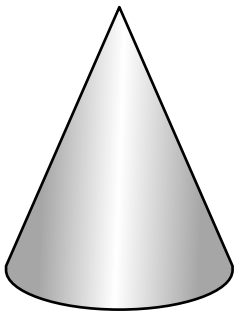
16 A sector of a circle of radius 18 cm is shown with angle POR = 80°
The sector is folded to form a cone.





Calculate the volume of the cone.

Answer _____ cm^3 [6]

THIS IS THE END OF THE QUESTION PAPER