



Rewarding Learning

Centre Number

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Candidate Number

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General Certificate of Secondary Education  
January 2015

## Mathematics

Unit T6 Paper 2  
(With calculator)  
Higher Tier



**MV18**

[GMT62]

WEDNESDAY 14 JANUARY, 10.45 am–12.00 noon

### TIME

1 hour 15 minutes, plus your additional time allowance.

### INSTRUCTIONS TO CANDIDATES

Write your Centre Number and Candidate Number in the spaces provided at the top of this page.

**You must answer the questions in the spaces provided.**

**Do not write on blank pages or tracing paper.**

Complete in blue or black ink only.

Answer **all twelve** questions.

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

You **may** use a calculator for this paper.

## INFORMATION FOR CANDIDATES

The total mark for this paper is 50.

Figures in brackets printed at the end of each question indicate the marks awarded to each question or part question.

Functional Elements will be assessed in this paper.

Quality of written communication will be assessed in **questions 2 and 3**.

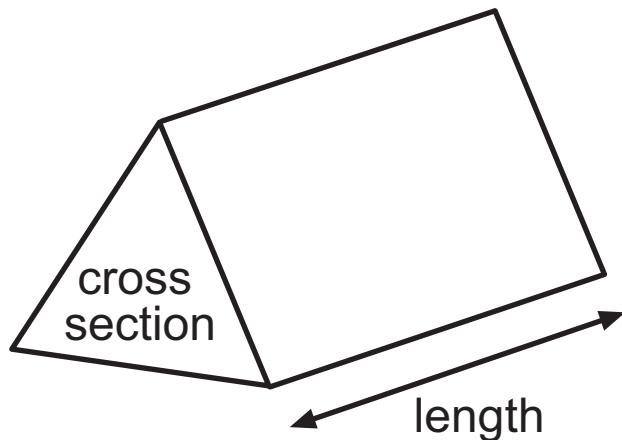
You should have a calculator, ruler, compasses and protractor.

The Formula Sheet is on pages 4 and 5.

## **BLANK PAGE**

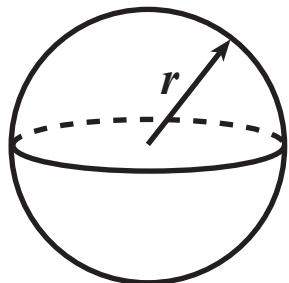
# Formula Sheet

**Volume of prism = area of cross section  $\times$  length**



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

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



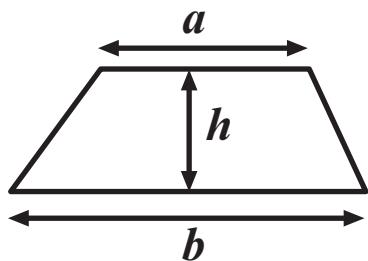
## Quadratic Equation

The solutions of  $ax^2 + bx + c = 0$

where  $a \neq 0$ , are given by

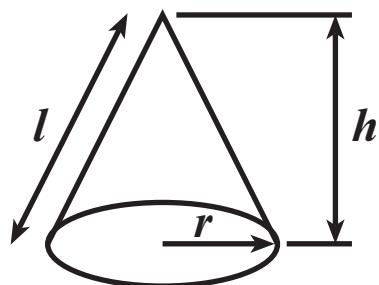
$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

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

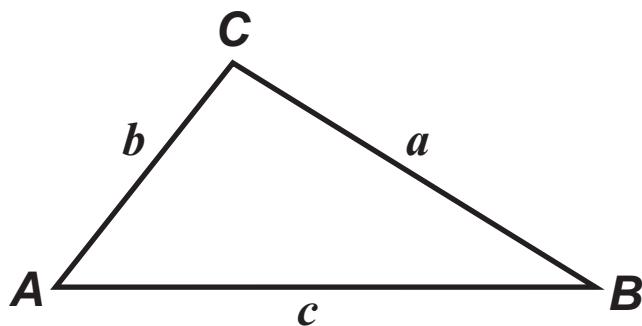


**Volume of cone** =  $\frac{1}{3} \pi r^2 h$

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



**In any triangle ABC**

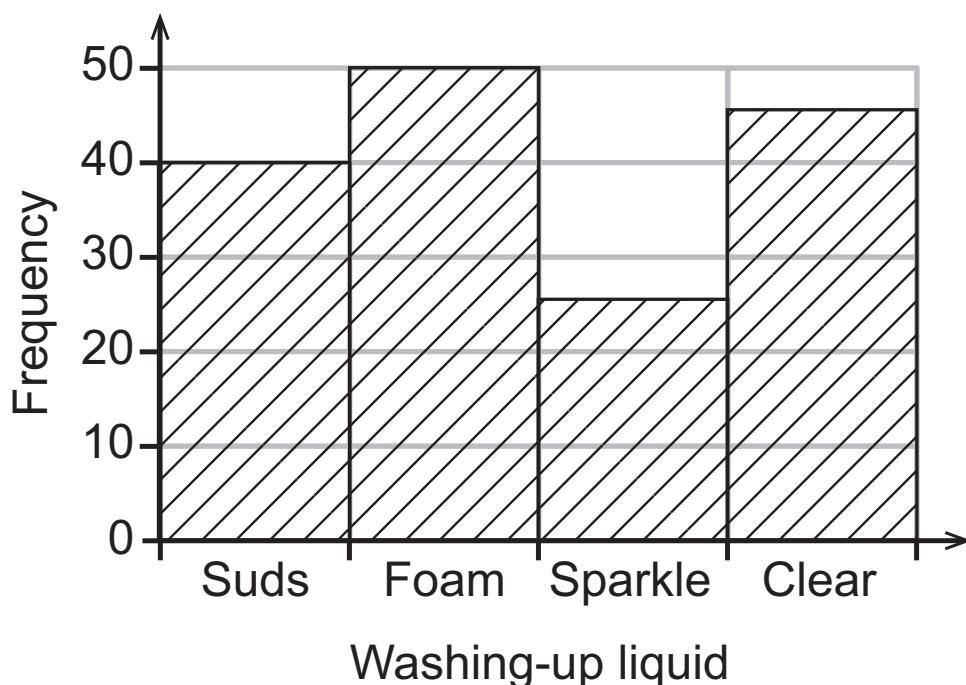


**Sine Rule:**  $\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$

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

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

- 1 A survey was carried out in a supermarket to find which washing-up liquid people buy.



- (a) A customer is chosen at random. What is the probability that they buy either Foam or Sparkle? [2 marks]

Answer \_\_\_\_\_

- (b) The supermarket is ordering new stock. They are going to order 8000 bottles in total. Based on the results of this survey, how many bottles of Clear should they order? [2 marks]

Answer \_\_\_\_\_

**Quality of written communication will be assessed in this question.**

**2 A plane flies between two cities.**

The plane leaves London at 0850, flies to Glasgow and returns to London arriving at 1305

The time spent in Glasgow is 45 minutes.

The second flight is 10 minutes longer than the first flight.

What is the arrival time in Glasgow of the first flight?

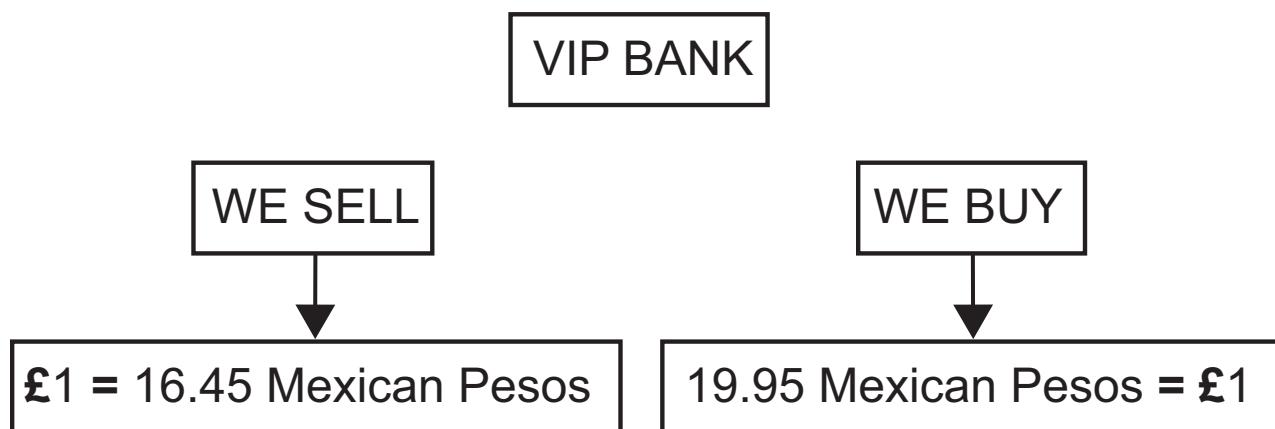
**Show each stage of your working clearly. [4 marks]**

Answer \_\_\_\_\_

**Quality of written communication will be assessed in this question.**

- 3 Banks have different rates for **selling** foreign currency or **buying** it.**

The VIP Bank advertises its rates as follows.



Daniel changes £900 into Pesos.

He has to cancel his holiday and change his Pesos back into Pounds.

There is a £3 commission charge on each exchange.

What is the total loss on his money exchange? [4 marks]

**Show clearly all your working.**

Answer £ \_\_\_\_\_

4 Electricity readings from a bill are shown below.

Previous	Present
93449	94969

(a) Calculate the number of units used. [1 mark]

Answer \_\_\_\_\_

(b) The cost of each unit is £0.1455

VAT is charged at 5%

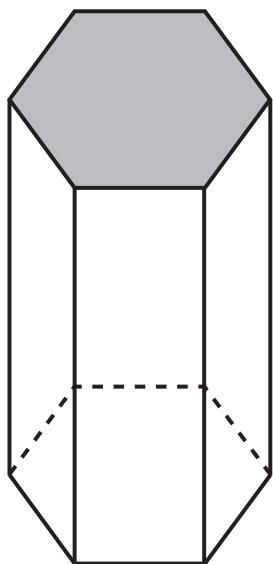
Calculate the total electricity bill. [3 marks]

Answer £ \_\_\_\_\_

- 5 The probability that a pupil in Meadowcroft School wears glasses is 0.15  
Seventy-two pupils in the school wear glasses.  
How many pupils are in Meadowcroft School? [2 marks]

Answer \_\_\_\_\_

- 6 A pillar is in the shape of a hexagonal prism as shown below.



The area of the shaded cross-section is  $960\text{cm}^2$

The height of the pillar is 1.2m

Calculate the volume of the pillar. [3 marks]

Answer \_\_\_\_\_

- 7 Part of the table for the graph of  $y = x^2 - 2x - 3$  is shown below.

(a) Fill in the blanks in the table. [2 marks]

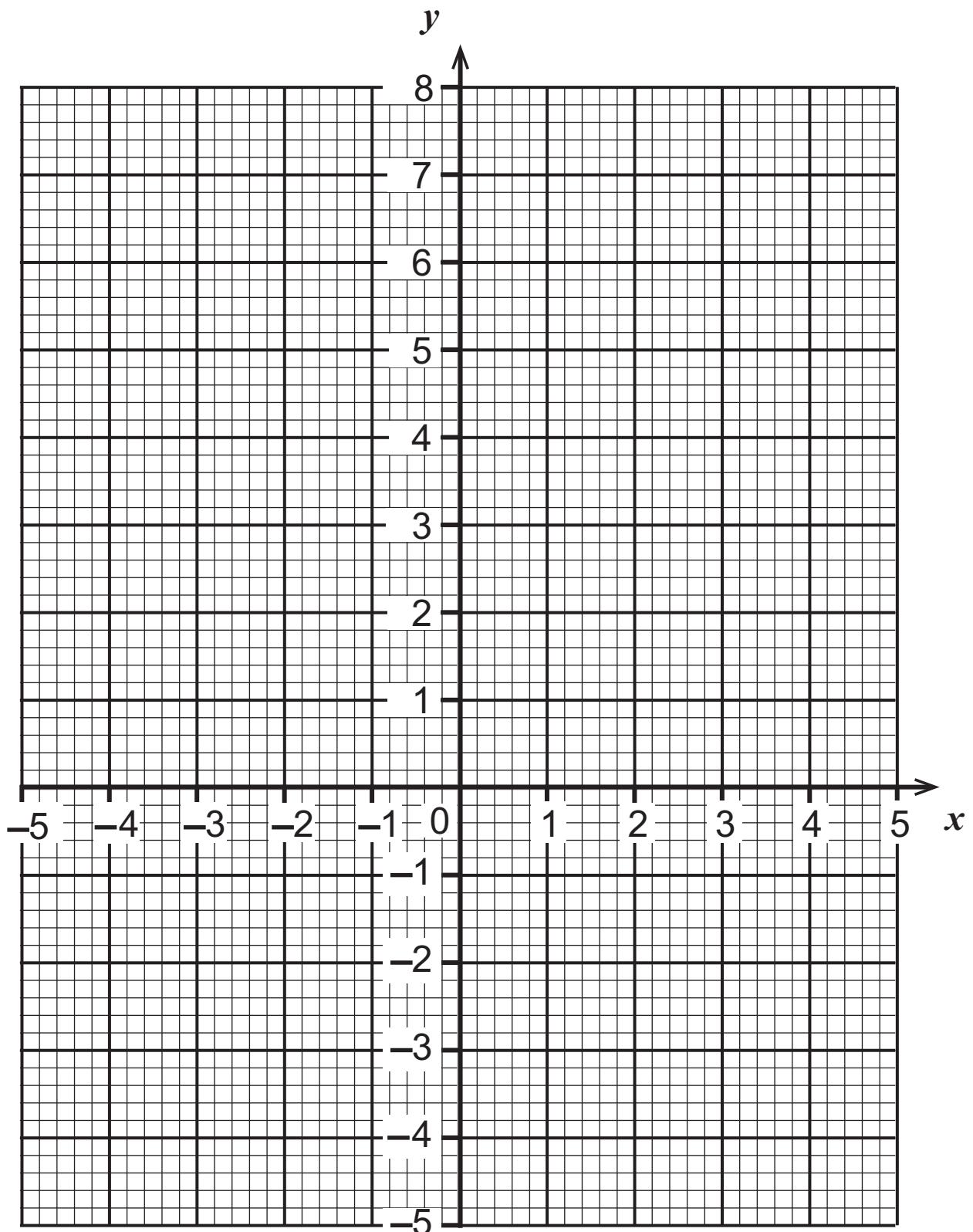
<b><math>x</math></b>	-2	-1	0	1	2	3	4
<b><math>y</math></b>	5	0			-3	0	5

(b) Use the values from the table to draw the graph opposite. [2 marks]

(c) By drawing an appropriate line on the graph, solve the equation [3 marks]

$$x^2 - 2x - 3 = x - 1$$

Answer  $x = \underline{\hspace{2cm}}$



- 8 (a) The teacher to pupil ratio in a school is 1:15  
There are 960 pupils in the school.  
How many teachers are there? [2 marks]

Answer \_\_\_\_\_

- (b) 418 of these pupils play football, netball or hockey in the ratio 11:3:8  
How many pupils play netball? [3 marks]

Answer \_\_\_\_\_

9 Show clearly how one solution to the equation

$$2x - \frac{12}{x} = 0 \text{ is } \sqrt{6} \quad [2 \text{ marks}]$$

10 (a) Given  $\sqrt{x+2} = 3a$  find  $x$  in terms of  $a$  [2 marks]

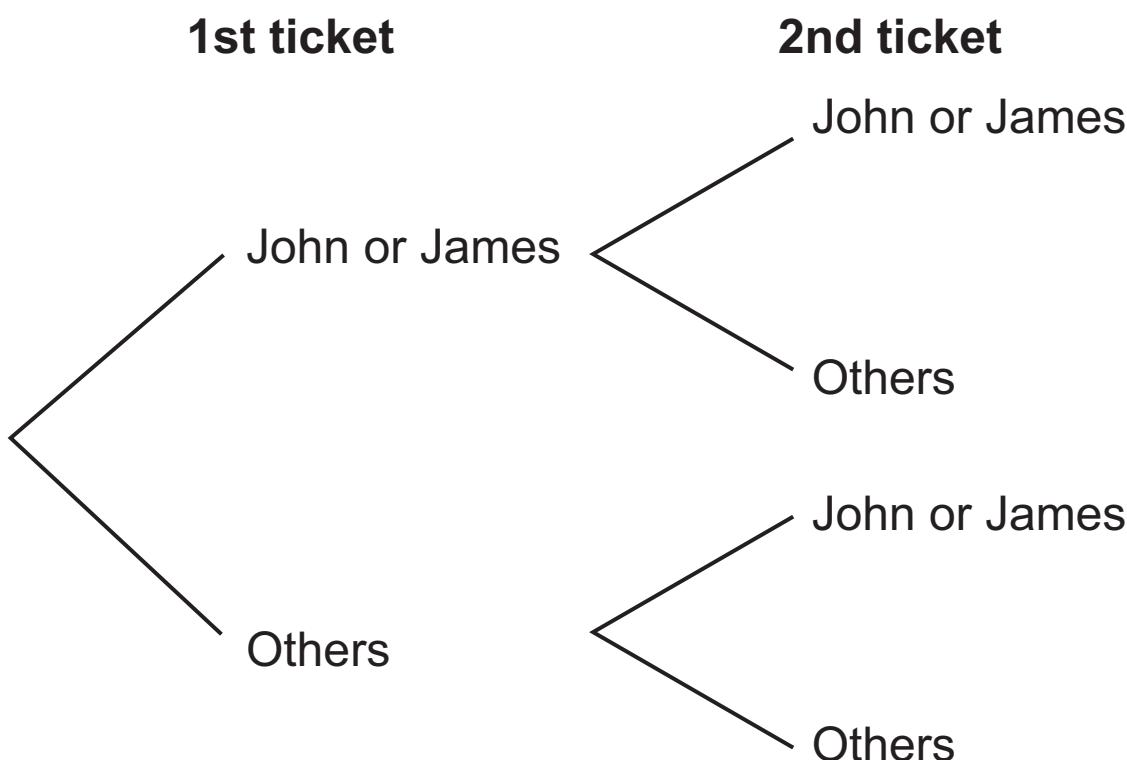
Answer  $x =$  \_\_\_\_\_

(b) Simplify  $\left(\frac{1}{2}xy^3\right)^2$  [2 marks]

Answer \_\_\_\_\_

11 John, his best friend James and three other friends share two season tickets for the rugby season matches. Before each match, the five select at random two of their names, to decide who gets the tickets for the match. John and James hope to go to the next match together.

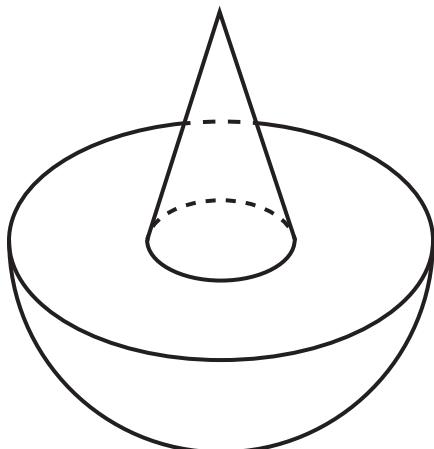
(a) Complete the tree diagram showing the probabilities for the selection of tickets for the next match. [3 marks]



(b) Calculate the probability that John and James both get tickets for the next match. [2 marks]

Answer \_\_\_\_\_

- 12 A solid wooden spinner is made up of a cone attached to a hemisphere as shown.



The hemisphere has a diameter of 16cm.

The base radius of the cone is 3cm and the vertical height of the cone is 10cm.

The surface of the spinner is to be painted. Calculate the surface area of the spinner.

Give your answer correct to 3 significant figures. [6 marks]

Answer \_\_\_\_\_  $\text{cm}^2$

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**THIS IS THE END OF THE QUESTION PAPER**

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<b>For Examiner's use only</b>	
<b>Question Number</b>	<b>Marks</b>
1	
2	
3	
4	
5	
6	
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10	
11	
12	

<b>Total Marks</b>	
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**Examiner Number**

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