

Surname	Centre Number	Candidate Number
Other Names		0



GCSE

4351/02



A14-4351-02

MATHEMATICS (UNITISED SCHEME)

UNIT 1: Mathematics In Everyday Life

HIGHER TIER

A.M. WEDNESDAY, 5 November 2014

1 hour 15 minutes

ADDITIONAL MATERIALS

A calculator will be required for this paper.
A ruler, a protractor and a pair of compasses may be required.

INSTRUCTIONS TO CANDIDATES

Use black ink or black ball-point pen.
Write your name, centre number and candidate number in the spaces at the top of this page.
Answer **all** the questions in the spaces provided.
Take π as 3.14 or use the π button on your calculator.

INFORMATION FOR CANDIDATES

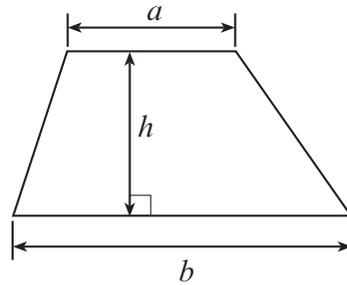
You should give details of your method of solution when appropriate.
Unless stated, diagrams are not drawn to scale.
Scale drawing solutions will not be acceptable where you are asked to calculate.
The number of marks is given in brackets at the end of each question or part-question.
You are reminded that assessment will take into account the quality of written communication (including mathematical communication) used in your answer to question **5**.

For Examiner's use only		
Question	Maximum Mark	Mark Awarded
1.	3	
2.	5	
3.	2	
4.	3	
5.	6	
6.	4	
7.	6	
8.	4	
9.	5	
10.	5	
11.	4	
12.	5	
13.	7	
14.	6	
Total	65	

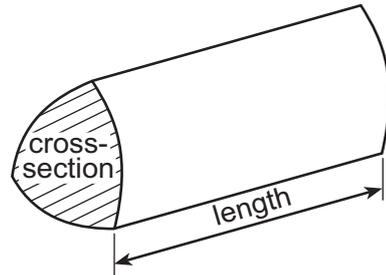
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Formula List

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

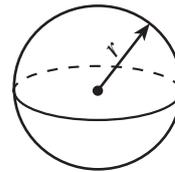


Volume of prism = area of cross-section \times length



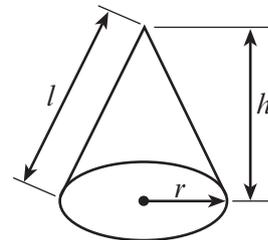
Volume of sphere = $\frac{4}{3}\pi r^3$

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



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

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

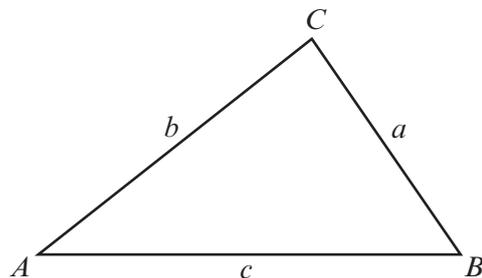


In any triangle ABC

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 = $\frac{1}{2}ab \sin C$



The Quadratic Equation

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

where $a \neq 0$ are given by

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

- 1. In a Park and Ride scheme, people leave their cars on the outskirts of a town and travel into town by bus.

A survey was carried out to decide if a town should start a Park and Ride scheme.

Shoppers in the town were asked the following four questions.

Q1. Did you travel into town by car?

YES NO

Q2. What type of car do you have?

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Q3. Was it easy to find a place in town to park your car?

YES NO

Q4. How many times would you use a Park and Ride, if available?

1-5 times	6-10 times	more than 10 times	less than 20 times
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

- (a) Which one of the first **three** questions would you remove? You must give a reason.

[1]

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- (b) Give **two** reasons why question 4 is not suitable.

[2]

Reason 1

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Reason 2

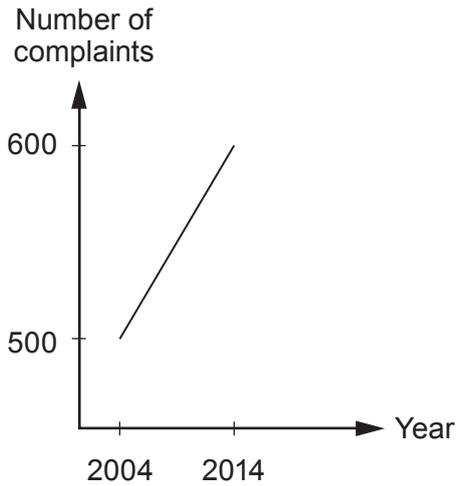
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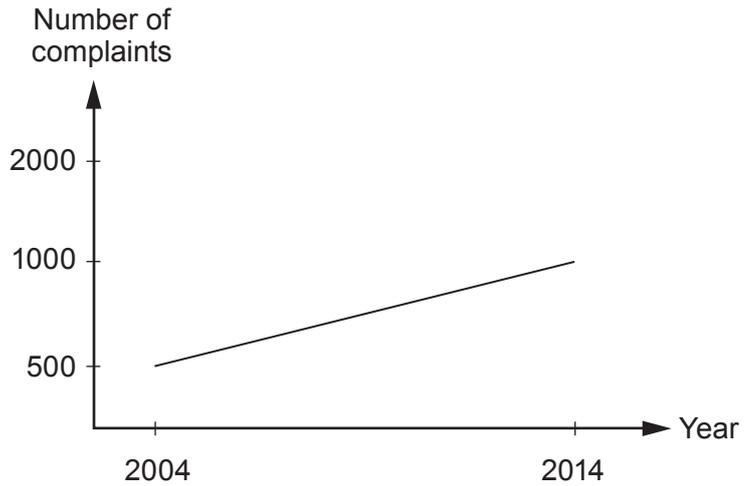
2. The district councils for Llankavani and Rossmuch have both been considering the number of complaints received from residents over a ten-year period. The graphs shown below were published in a local newspaper under the following headline.

How satisfied are you with your Council?

Llankavani Council



Rossmuch Council



- (a) Looking only at the two graph lines drawn, how could someone mistakenly think that there has been a greater increase in complaints to the Llankavani council than to the Rossmuch council? [1]

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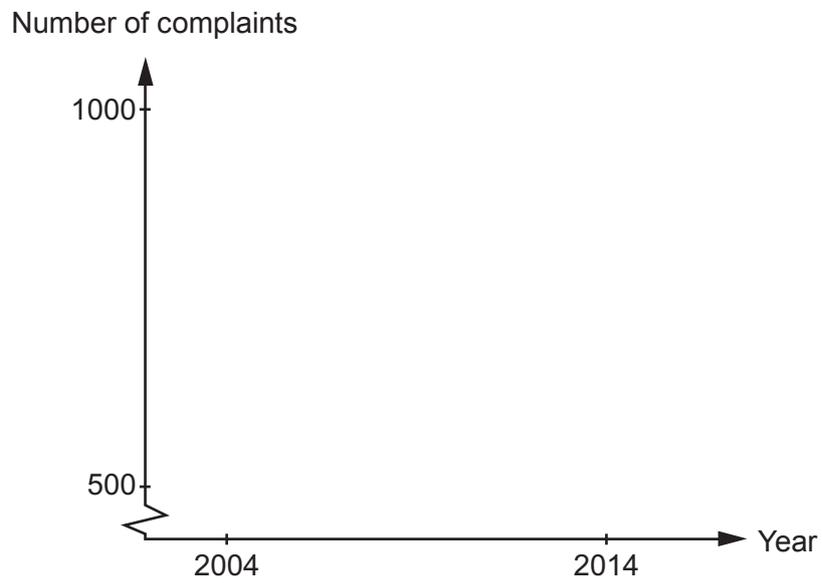
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- (b) Give **one** reason why these graphs cannot be easily compared. [1]

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- (c) On the diagram below, use a suitable uniform scale on the vertical axis and draw two lines that will show the information for Llinkavani and Rossmuch. Label each line with the name of the council it represents. [3]

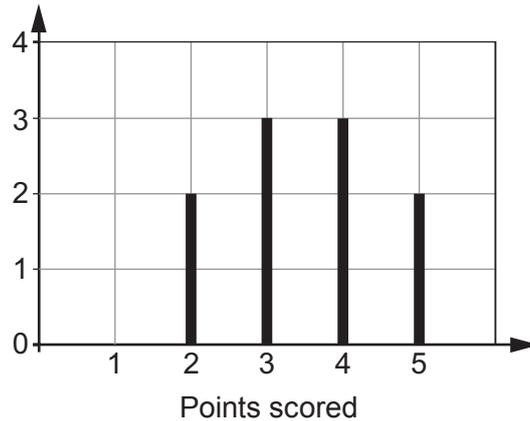


3. Catrin and Samir each played a game ten times.
In each game, between one and five points were scored.

Catrin had a mean score of 2.7 points for her ten games.
The range of the number of points she scored on her games was 4.

Samir recorded his scores as shown on the grid below.

Number of games



- (a) Who had the bigger mean score?
You **must** give a reason for your answer.

[1]

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- (b) Who had the bigger range of the number of points scored?
You **must** give a reason for your answer.

[1]

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4. A warehouse displays price labels which are **exclusive** of VAT on all the items it sells. Brendan bought a weed-killer spray which had a price label of £27.50. VAT is currently 20%.

How much change did he receive when he paid for the item with two £20 notes?

[3]

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6. Eleri invests £3700 for 3 years at 2% per annum compound interest.
Calculate the value of her investment at the end of the 3 years.
Give your answer correct to the nearest penny.

[4]

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7. The grid below can be used to find the distances, in miles, between four schools labelled A, B, C and D.

	A	B	C	D
A		9	7	4
B	9		12	6
C	7	12		5
D	4	6	5	

For example, the distance between school D and school B is 6 miles.

	A	B	C	D
A		9	7	4
B	9		12	6
C	7	12		5
D	4	6	5	

Mr Morgan, from school A, was required to visit all the other three schools and then return to school A.

He went from A to B, then from B to C, then from C to D before returning from D to A. This was a total of 30 miles.

- (a) Mr Morgan took 1 hour and 30 minutes to travel this distance of 30 miles in his car. Calculate his average speed, in miles per hour. [3]

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- (b) Find **two** other **different** routes Mr Morgan could have taken, starting and finishing at school A.
You must calculate the total distance covered in each case. [3]

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9. The following is a formula that is used by engineers to measure the velocity of an object travelling in a straight line under certain conditions.

$$v^2 = u^2 + 2as$$

- s is the distance travelled from the start
- v is the object's velocity after it has travelled a distance s
- u is the object's initial velocity
- a is the constant acceleration of the object

- (a) The initial velocity of an object is 4 metres per second.
After travelling a distance of 64 metres, its velocity is 20 metres per second.
Find the acceleration of the object.

[3]

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- (b) Assuming the acceleration remains the same, show whether or not the object has reached a velocity of 25 metres per second when it is at a distance of 100 metres from the start.

[2]

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10. Since being given a new feed, a pig has shown a 25% increase in weight. The pig now weighs 297 pounds (lb). What did the pig weigh when it was first started on the new feed? Give your answer in **kilograms (kg)**.

[5]

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