

Surname	Centre Number	Candidate Number
Other Names		0



GCSE

4351/02

MATHEMATICS (UNITISED SCHEME)

UNIT 1: Mathematics in Everyday Life

HIGHER TIER

A.M. FRIDAY, 10 January 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.

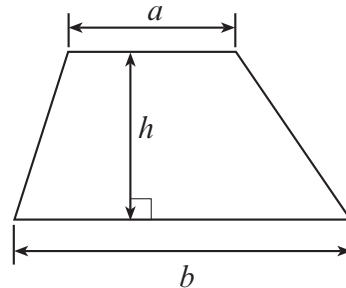
The number of marks is given in brackets at the end of each question or part-question.

You are reminded that assessment will take into account the quality of written communication (including mathematical communication) used in your answer to question 3.

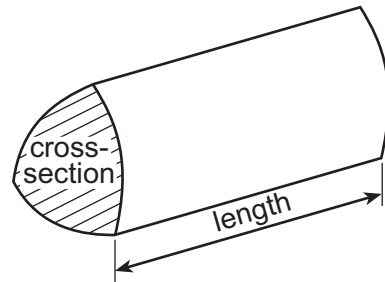
For Examiner's use only		
Question	Maximum Mark	Mark Awarded
1.	3	
2.	7	
3.	8	
4.	4	
5.	5	
6.	3	
7.	5	
8.	3	
9.	4	
10.	6	
11.	8	
12.	9	
Total	65	

Formula List

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

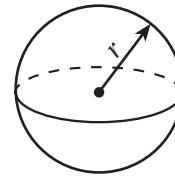


Volume of prism = area of cross-section \times length



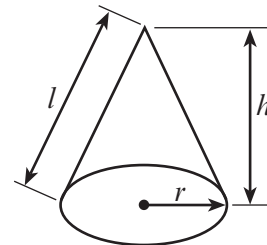
Volume of sphere = $\frac{4}{3}\pi r^3$

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



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

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

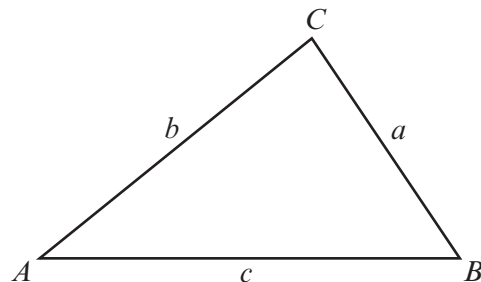


In any triangle ABC

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. Asif used his calculator to find the value of

$$\frac{85 \times 43}{17 + 35}$$

He pressed the following buttons on his calculator in this order.

8	5	×	4	3	÷	1	7	+	3	5	=
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The answer he got was 250. This answer is incorrect.

- (a) Explain what Asif did wrong.

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- (b) Find the correct value of

$$\frac{85 \times 43}{17 + 35}$$

Write your answer correct to 3 significant figures.

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(b) Did this stall make a profit or a loss?
You must calculate the amount of this profit or loss.

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4. Grace invests £8240 for 2 years at 3% per annum compound interest.
Find the compound interest earned in the 2 years.
Your answer should be given correct to the nearest penny.

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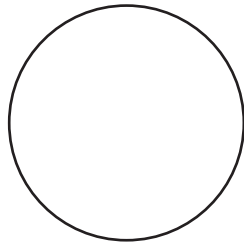
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5. A white circular card is to be placed on a grey square card, whose side measures 20 cm.



The size of the circle is such that it can be placed on the square card with its edge just touching, but not overlapping, each of the four sides of the square.

Calculate the percentage of the grey card that will be still visible when the circle is placed on the square card as described. [5]

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6. The bill for repairing a washing machine came to £151.68, inclusive of VAT at 20%.
What was the cost before VAT was added?

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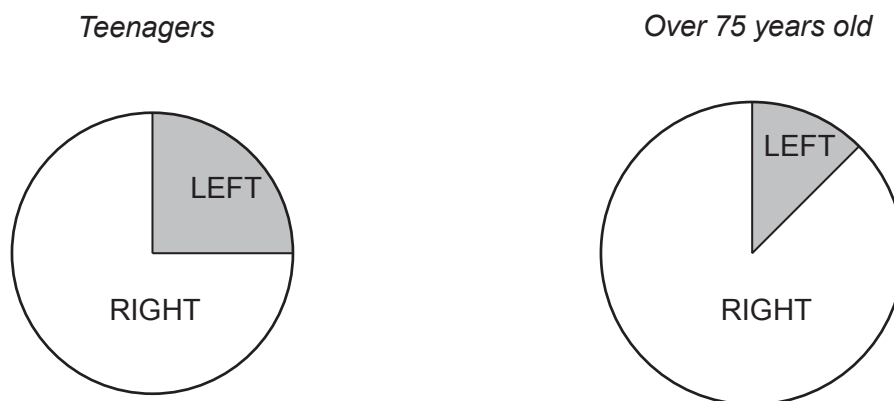
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7. (a) Clearly explain why the statements that accompany each of the following diagrams in a newspaper may not be true. Your comments should be based on the diagrams and not on your personal opinion.

(i) Taken from an item about left-handedness. [1]



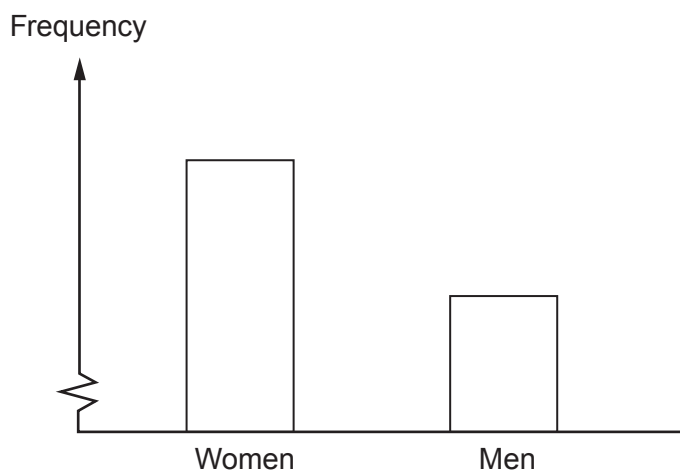
'There are twice as many left-handed teenagers as there are left-handed people over 75 years old.'

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(ii) Taken from an item about accidents in the home. [1]



'Twice as many women as men have accidents in the home.'

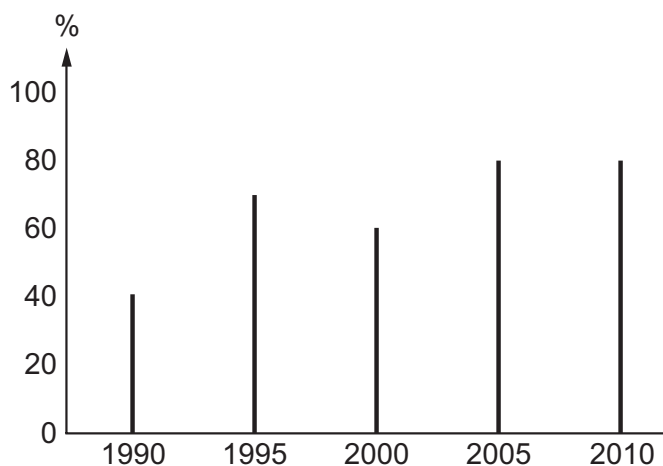
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(iii) Taken from an item about a school's examination percentage pass rates.

[1] Examiner only

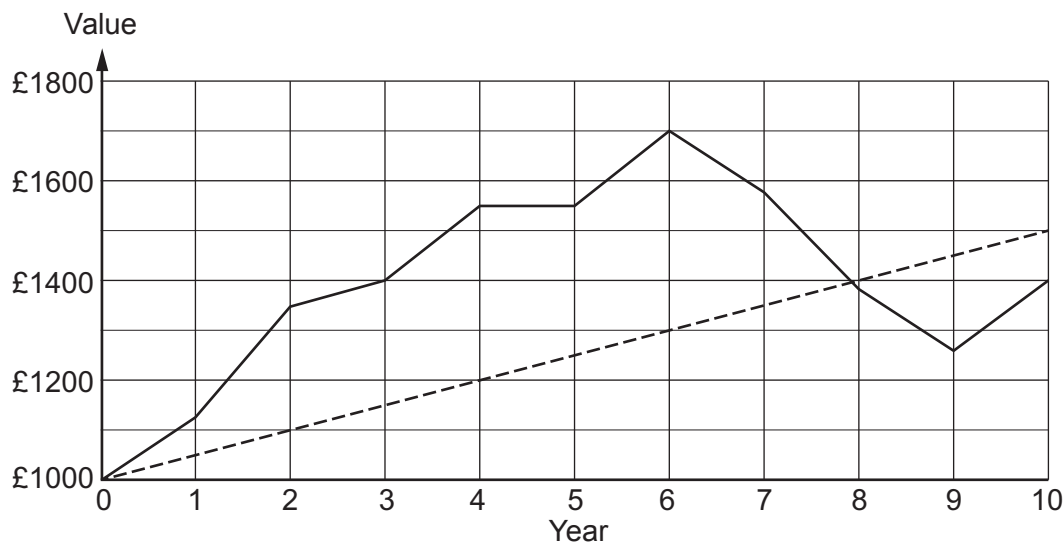


'The percentage pass rate has remained constant between 2005 and 2010.'

(b) The graph below was published in a newspaper.
The graph compares the value of an investment of £1000 in

- a company's shares (———)
- a fixed interest savings account (- - - -)

over a ten year period.



Explain clearly why the following statement is true.

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'At its greatest, the difference in the value of the shares and the savings account was 40% of the investment.'

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8. A construction company used 36 manual workers to prepare a building site.
The site measured 42 acres and the work was completed in 10 days.

The company is asked to do similar work on a similar site measuring 70 acres.
This contract has to be completed in 15 days.

Calculate the least number of manual workers the company should employ for this contract.

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9. A gas company uses the following formula to calculate how much to charge its customers.

$$\text{charge (in pence)} = (U \times 11.546 + D \times 31.48) \times 1.05$$

The number of units of gas used by a customer is **U** and the number of days in the billing period is **D**.

A customer was charged £165.53 over a billing period of 90 days.
Calculate the number of gas units this customer used during this period.

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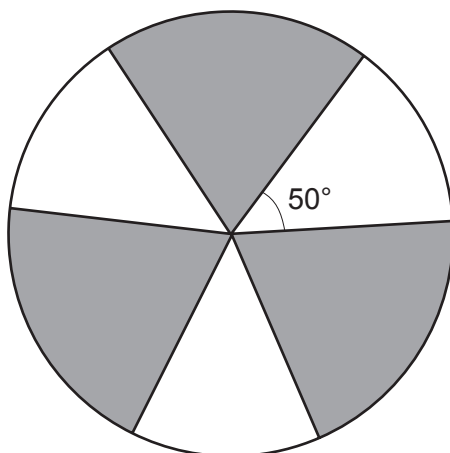
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11. A circular logo, with radius 8 cm, is shown below.



All three white sectors are equal in size and shape.
All three shaded sectors are equal in size and shape.

- (a) Calculate the total area of the shaded sectors.

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- (b) The whole perimeter of all the shaded sectors is to be drawn in red.
Calculate the total length of all these red boundary lines.

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12. An ornamental garden spike is in the form of a square based pyramid with a cone attached to the centre of its base as shown below.

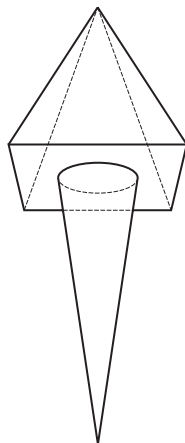


Diagram not drawn to scale

The radius of the base of the cone is 4 cm.
The height of the cone is twice the height of the pyramid.
The volume of the cone is equal to the volume of the pyramid.

- (a) Calculate the length of the base of the pyramid.

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(b) The total volume of the spike (cone and pyramid together) is 335.1 cm^3 .

Calculate the total length of the spike (from the tip of the cone to the top of the pyramid).
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