



**For teaching from 2010
For awards from 2012**

GCSE MATHEMATICS

SPECIMEN ASSESSMENT MATERIALS

Contents

	Page
Question Papers	5
Unit 1 - Foundation Tier	7
Unit 1 - Higher Tier	27
Unit 2 - Foundation Tier	43
Unit 2 - Higher Tier	61
Unit 3 - Foundation Tier	81
Unit 3 - Higher Tier	101
Mark Schemes and Assessment Grids	123
Unit 1 - Foundation Tier	125
Unit 1 - Higher Tier	129
Unit 2 - Foundation Tier	133
Unit 2 - Higher Tier	137
Unit 3 - Foundation Tier	141
Unit 3 - Higher Tier	145
Summary Assessment Grids	149

QUESTION PAPERS

Candidate Name	Centre Number	Candidate Number

**GCSE****(UNITISED SCHEME)****MATHEMATICS****UNIT 1: MATHEMATICS IN EVERYDAY LIFE****SPECIMEN PAPER****FOUNDATION TIER** $1\frac{1}{4}$ hours**ADDITIONAL MATERIALS**

A calculator will be required for this paper.

INSTRUCTIONS TO CANDIDATES

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.

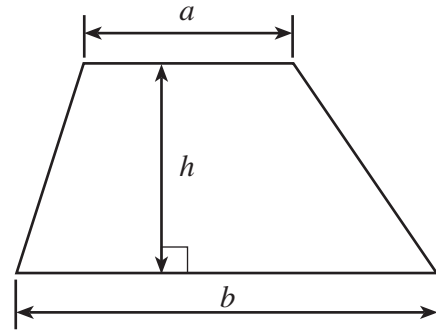
The number of marks is given in brackets at the end of each question or part-question.

You are reminded that assessment will take into account the quality of written communication (including mathematical communication) used in your answer to question **15**.

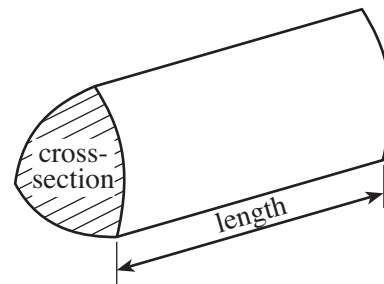
For Examiner's use only		
Question	Maximum Mark	Mark Awarded
1	4	
2	4	
3	5	
4	6	
5	3	
6	3	
7	5	
8	2	
9	4	
10	5	
11	3	
12	3	
13	5	
14	3	
15	10	
TOTAL MARK		

Formula List

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



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



2. A band performed for 3 nights, Thursday to Saturday, at the local theatre.

The size of the audience for the three nights was 348 on Thursday, 450 on Friday and 412 on Saturday.

(a) What was the difference in the size of the audience between the highest attendance and the lowest attendance?

.....
.....
.....
.....

[2]

(b) An extra performance was arranged for the Sunday.
Tickets were sold at £12 each.
The sale of tickets for the Sunday performance totalled £3804.
How many tickets were sold?

.....
.....
.....
.....

[2]

3. A baby-sitting service advertises its rates as shown below.

Little Tots

Baby & Toddler baby-sitting service
(0 to 5 year olds)

Rates as shown below

COST = NUMBER of HOURS X £6 + TAXI FARE

- (a) How much would it cost to hire a baby-sitter from 6 p.m. until 10 p.m. when the taxi fare for the baby-sitter was £9?

.....

.....

.....

.....

[3]

- (b) Mr and Mrs Thomas paid Little Tots £30.55 for someone to look after their small child for 3 hours.

How much was the taxi fare?

.....

.....

.....

[2]

4. The maximum and minimum temperatures in five European cities were recorded yesterday. The table below shows the results.

	Maximum ($^{\circ}\text{C}$)	Minimum ($^{\circ}\text{C}$)
London	7	2
Paris	10	1
Budapest	4	-3
Moscow	-1	-5
Rome	8	2

- (a) Which of the five cities recorded the lowest temperature?

.....
[1]

- (b) What was the difference yesterday between the maximum temperature and the minimum temperature in

- (i) London,

.....
[1]

- (ii) Budapest?

.....
[1]

- (c) In which of these five cities was the biggest difference between the maximum temperature and the minimum temperature recorded?

.....
[1]

- (d) The maximum temperature in Moscow today is 3°C higher than it was yesterday. What is the maximum temperature in Moscow today?

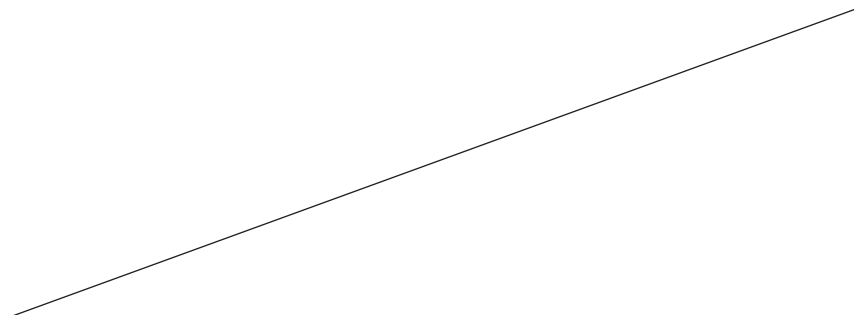
.....
[1]

- (e) The minimum temperature in Budapest today is 2°C lower than it was yesterday. What is the minimum temperature in Budapest today?

.....
[1]

5. A factory makes triangular metal plates for a customer.

A scale drawing of the plate is shown below.



Scale : 1cm represents 5cm.

- (a) Measure, and write down, the size of the smallest angle.

..... [1]

- (b) Calculate the actual length of the longest side of the metal plate.

.....
.....
..... [2]

6. You and your friends are staying at a holiday cottage in France.

You are asked to go to the nearest village to buy some food.

- (a) The village is 16 kilometres away.
Approximately how many miles is this?

.....
[1]

- (b) The following two items have been written on your shopping list.

1 pint of milk.

4 lbs of potatoes.

Put a ring around the volume of milk and the weight of potatoes you should buy that are nearest to the amounts you wish to have.

- (i) Milk.

$\frac{1}{2}$ litre

1 litre

2 litres

[1]

- (ii) Potatoes.

$\frac{1}{2}$ kg

2 kg

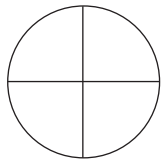
4 kg

[1]

BLANK PAGE

7. A librarian recorded the number of books that were loaned each day for one week.

Using the symbol



to represent 20 books,

he drew the following pictogram to record the results for Monday to Friday.

Monday	
Tuesday	
Wednesday	
Thursday	
Friday	

- (a) (i) How many books were loaned on the Monday?

..... [1]

- (ii) How many more books were loaned on Thursday than on Tuesday?

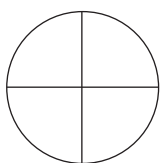
.....
 [2]

- (iii) On one of these five days the library was only open in the morning.
 Which day do you think this was?

..... [1]

- (b) On the Saturday the library loaned 55 books.

Using the same symbol



to represent 20 books,

complete, below, the pictogram for the Saturday.

Saturday	
----------	--

[1]

8. Twenty pounds is shared between three people.

Ann receives exactly twice as much as Gareth.

Lucy receives less than Gareth.

Write down possible amounts that they might have each received.

.....

.....

.....

.....

Ann = £ Gareth = £ Lucy = £

[2]

9. The timetable below shows the times of trains that travel from Liverpool to Nottingham.

Liverpool	06:47	07:47	08:52	10:52	12:52	14:52	16:52	17:52	18:52	19:52
Warrington	07:15	08:16	09:17	11:17	13:17	15:17	17:17	18:17	19:17	20:17
Manchester	07:43	08:42	09:42	11:42	13:42	15:42	17:42	18:44	19:42	20:42
Stockport	07:54	08:53	09:55	11:55	13:55	15:51	17:53	18:55	19:55	20:55
Chesterfield		09:44		12:47	14:47		18:56	19:45		21:38
Nottingham	09:35	10:31	11:35	13:32	15:32	17:39	19:44	20:36	21:37	22:33

- (a) How many trains leave Liverpool for Nottingham after 6 p.m.?

.....
[1]

- (b) A couple staying in Manchester need to be in Nottingham before 12:30.
What is the latest time they can leave Manchester by train?

.....
[1]

- (c) You travel by train from Liverpool to Nottingham.
You want to catch a connecting train from Nottingham to Cardiff.
This train leaves Nottingham at 11:00.
How long do you expect to be waiting at Nottingham for the train to Cardiff?

.....
.....
[2]

10. (a) Sanjay exchanged £400 into euros in order to visit Milan.

The exchange rate was £1 = 1.14 euros.
How many euros did he receive?

.....

.....

.....

.....

[2]

- (b) When in Milan he paid 60 euros for a ticket to watch a football match.
Assuming the same exchange rate, what is the value of this ticket, in £, correct to the nearest pound?

.....

.....

.....

.....

[3]

11.

Cash Price
£950

Hire Purchase Price
Deposit: 12% of Cash Price
+ 36 monthly payments of £30.



What is the hire purchase price?

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

[3]

Turn over.

12. The points P and Q represent the positions of two radar stations.
Helicopter H is on a bearing of 145° from P and 240° from Q .
Clearly drawing all necessary lines, mark the position of the helicopter H .

[3]



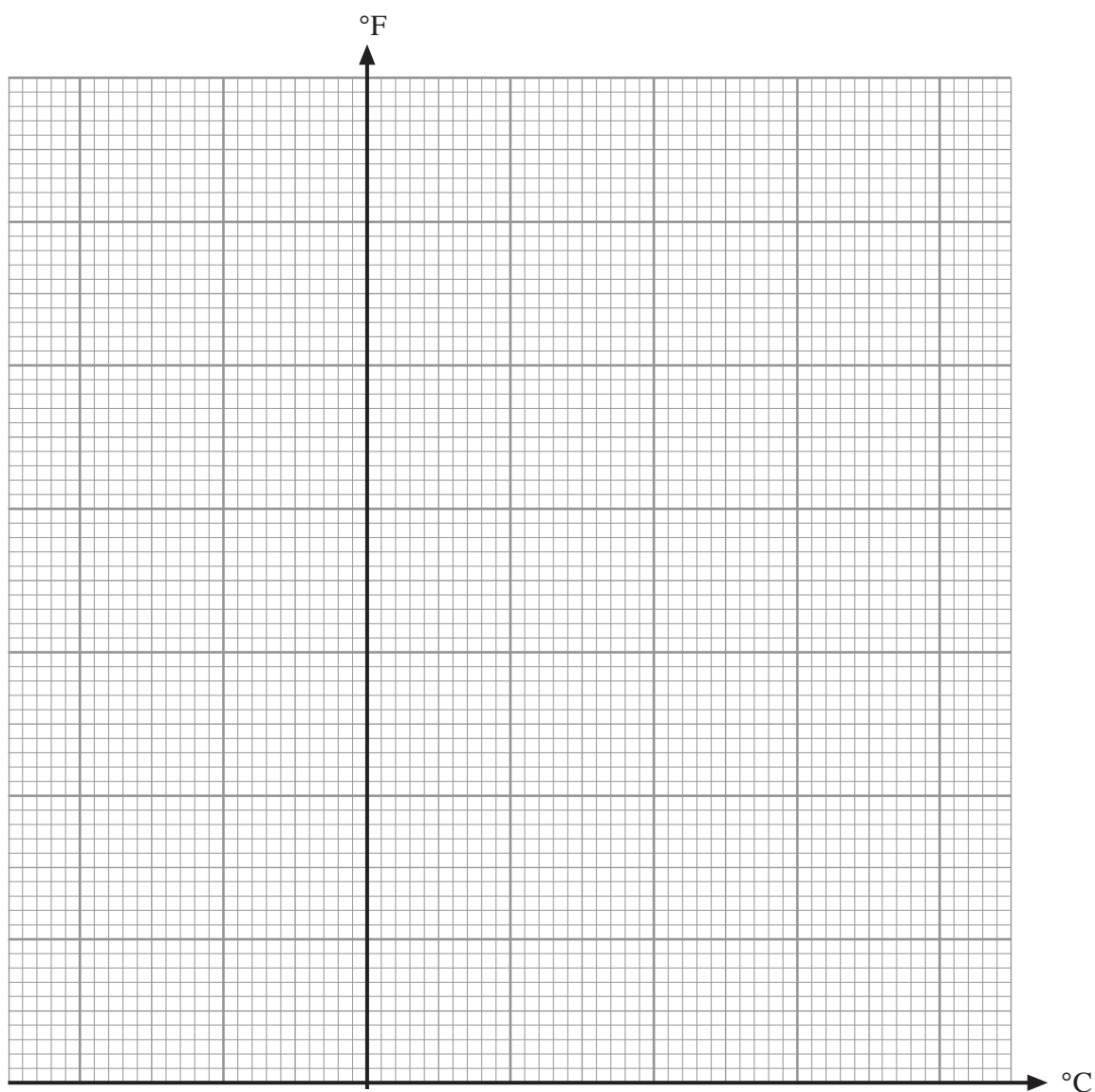
13. The temperature of three items A, B and C was measured in both degrees Celsius ($^{\circ}\text{C}$) and degrees Fahrenheit ($^{\circ}\text{F}$).

The table below shows the results.

	Item A	Item B	Item C
$^{\circ}\text{C}$	-10	10	20
$^{\circ}\text{F}$	14	50	68

- (a) Use the data in the table to draw a conversion graph between $^{\circ}\text{C}$ and $^{\circ}\text{F}$.

[4]



- (b) Water freezes at 0°C . Use your graph to find this temperature in $^{\circ}\text{F}$.

[1]

Turn over.

14. A person is thinking of setting up a business selling sandwiches at the local industrial park. A survey was carried out to obtain data on how often people would make use of the mobile sandwich bar.

People were asked the following question.

How many times would you visit the mobile sandwich bar?			
1-3 times	<input type="checkbox"/>	4-6 times	<input type="checkbox"/>
7-10 times	<input type="checkbox"/>	10 or more	<input type="checkbox"/>

Give three reasons why the question is not suitable.

.....

.....

.....

.....

.....

.....

.....

.....

.....

[3]

Candidate Name	Centre Number	Candidate Number

**GCSE****(UNITISED SCHEME)****MATHEMATICS****UNIT 1: MATHEMATICS IN EVERYDAY LIFE****SPECIMEN PAPER****HIGHER TIER** $1\frac{1}{4}$ hours**ADDITIONAL MATERIALS**

A calculator will be required for this paper.

INSTRUCTIONS TO CANDIDATES

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.

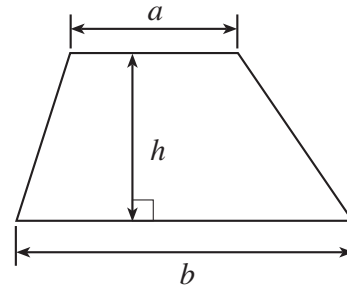
The number of marks is given in brackets at the end of each question or part-question.

You are reminded that assessment will take into account the quality of written communication (including mathematical communication) used in your answer to question 5.

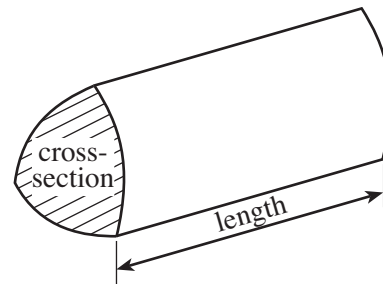
For Examiner's use only		
Question	Maximum Mark	Mark Awarded
1	3	
2	6	
3	5	
4	4	
5	10	
6	5	
7	8	
8	7	
9	3	
10	4	
11	10	
TOTAL MARK		

Formula List

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

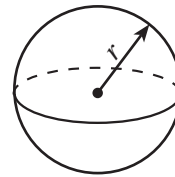


Volume of prism = area of cross-section \times length



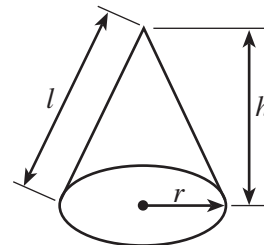
Volume of sphere = $\frac{4}{3}\pi r^3$

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



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

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

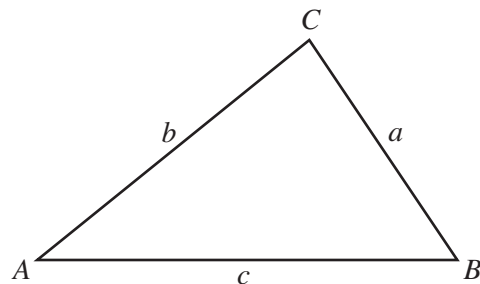


In any triangle ABC

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. A store is reducing the price on all of its goods by 15%.
What would be the selling price of a computer that was originally priced at £460?

.....

.....

.....

.....

.....

.....

[3]

2. Mrs Brown’s electricity account with Valley Power, with some of the entries removed, is shown below.

She pays for her electricity by monthly direct debit payments and gets a discount of £8.50 for paying in that way.

Use the information given on the account to complete all of the missing entries and to calculate the balance to carry forward to her next account.

Valley Power		Electricity Account		
		<i>Period: 1st January 2009 to 31st March 2009</i>		
F. Brown 12 Hill Street Margam.				
Previous Meter Reading	Current Meter Reading	Units Used	Price per unit (in pence)	Amount (£)
3785	5927	12.5
	Quarterly charge			27.45
	Total charge		
	VAT at 5% of total charge		
	Balance from previous quarter			23.18
	Total to pay		
	<i>Payments received</i>			
	Direct Debit Discount			8.50CR
	Received	25 th January 2009		100.00CR
	Received	25 th February 2009		100.00CR
	Received	25 th March 2009		100.00CR
	Balance to carry forward		

Working

.....

.....

.....

3. (a) A cylindrical can of paint has a base radius of 11 cm and a height of 26 cm.

Calculate the volume of the can, giving your answer correct to the nearest litre.

.....

.....

.....

.....

.....

[3]

- (b) The volume of a water storage tank is 2 cubic metres.
How many litres of water can it hold when fully filled?

.....

.....

.....

.....

[2]

4. Find to the nearest penny, the compound interest earned when £3500 is invested for 3 years at 5% per annum.

.....

.....

.....

.....

.....

.....

.....

.....

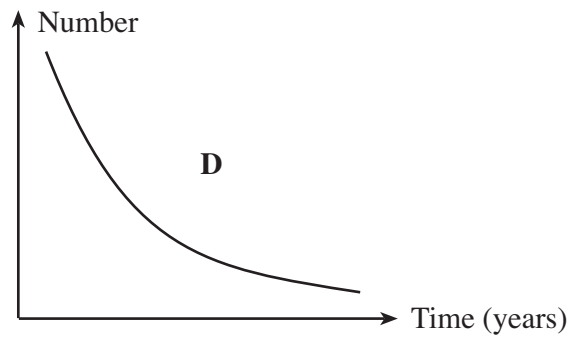
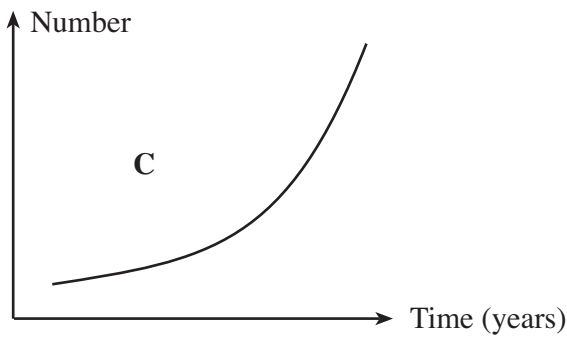
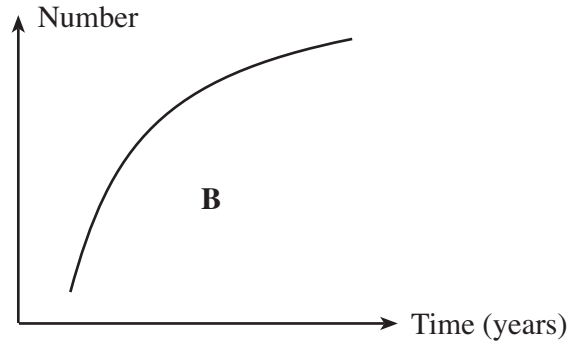
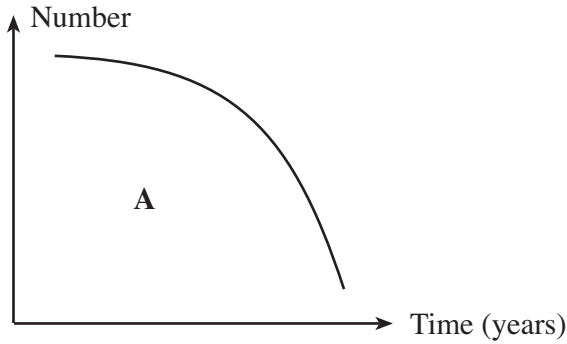
.....

.....

.....

[4]

6. (a) The diagrams below show sketches of four graphs labelled **A**, **B**, **C** and **D** seen in a newspaper.



For each of the following newspaper headlines write down **A**, **B**, **C** and **D** to indicate the diagram that best fits with the headline.

- (i) “Increase in gun crime is slowing down.”

Diagram

- (ii) “Decrease in cod caught in the North Sea is getting worse.”

Diagram

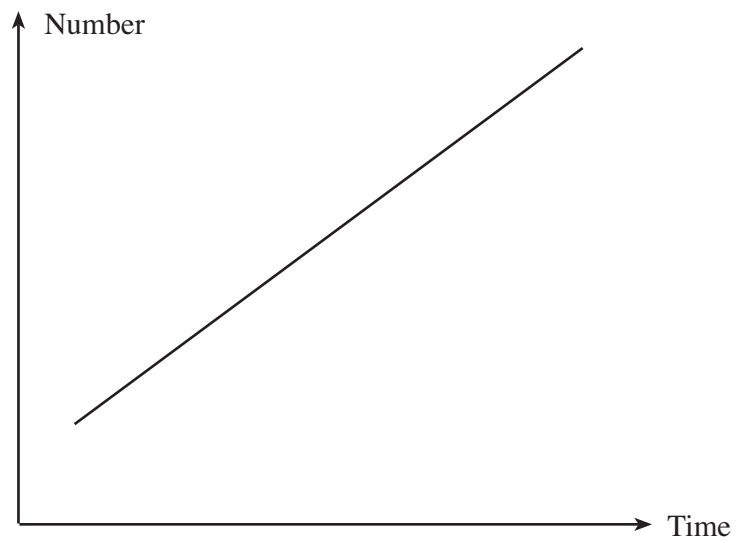
- (iii) “Decrease in red squirrel population is slowing down.”

Diagram

- (iv) “Speeding convictions increasing at a faster rate each year.”

Diagram

(b) Write down a possible headline that might have accompanied the following graph.



.....

.....

.....

[2]

9. A contractor has been asked to give a time scale for completing a contract for surface treating 8 miles of road.

Last year the contractor did similar work on the same type of road in 18 days.

At that time he had a work force of 20 men and 12 miles of road was treated.

This time he only has a work force of 16 men.

Showing all your calculations, how long would the work be expected to take given that all other conditions will be similar to last year?

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

[3]

10. The owner of a holiday cottage decides to increase the weekly hire price by 20% for the summer months.
Towards the end of the summer she reduces this new price by 20%.
Find the percentage of the original price that it would now cost to hire the cottage for one week.

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

[4]

11. A garden centre sells water containers of the shape and size shown below. (*The shape remaining when the top of a cone has been removed.*)

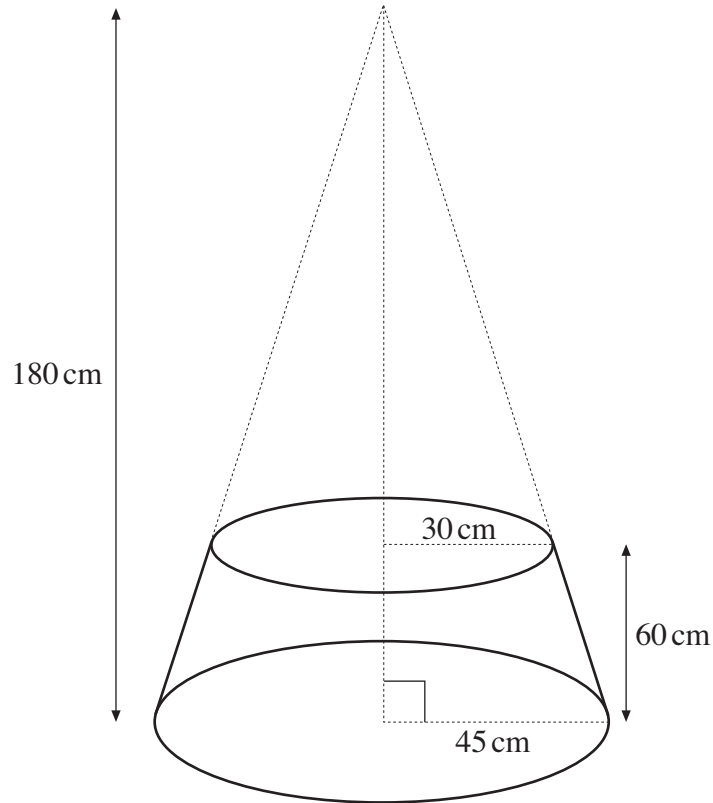


Diagram not drawn to scale.

The garden centre also sells water containers that are hemispherical in shape.

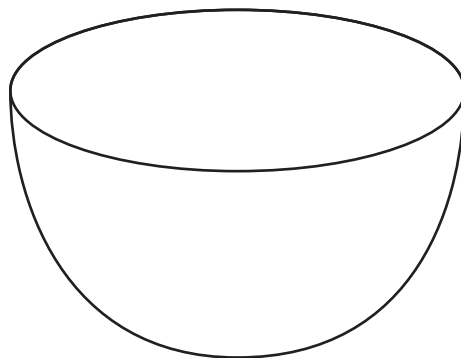


Diagram not drawn to scale.

Candidate Name	Centre Number	Candidate Number
		0

**GCSE****(UNITISED SCHEME)****MATHEMATICS****UNIT 2: NON-CALCULATOR MATHEMATICS****SPECIMEN PAPER****FOUNDATION TIER** $1\frac{1}{4}$ hours

**CALCULATORS ARE
NOT TO BE USED
FOR THIS PAPER**

INSTRUCTIONS TO CANDIDATES

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 $3\cdot 14$.

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.

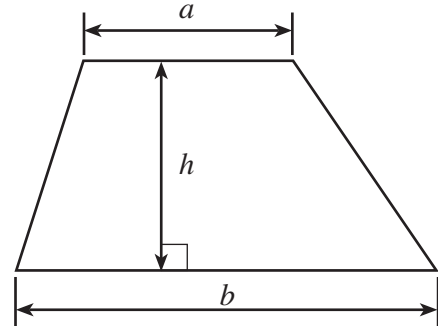
The number of marks is given in brackets at the end of each question or part-question.

You are reminded that assessment will take into account the quality of written communication (including mathematical communication) used in your answer to question **13**.

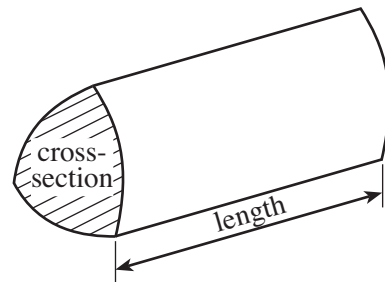
For Examiner's use only		
Question	Maximum Mark	Mark Awarded
1	8	
2	7	
3	4	
4	3	
5	3	
6	3	
7	2	
8	4	
9	5	
10	4	
11	4	
12	4	
13	6	
14	3	
15	5	
TOTAL MARK		

Formula List

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



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



1. (a) Write down, in figures, the number seven thousand and forty six.

..... [1]

- (b) Find the sum of 468 and 397.

.....
.....
..... [1]

- (c) Find the difference between 458 and 139.

.....
.....
..... [1]

- (d) Write 7936

- (i) correct to the nearest 10,

..... [1]

- (ii) correct to the nearest 100.

..... [1]

- (e) Write down the value of the 5 in the number 46578.

..... [1]

- (f) Write down all the factors of 14.

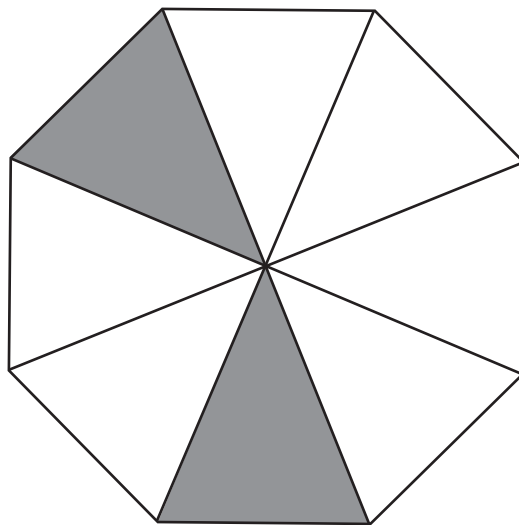
..... [2]

2. (a) How many shirts at £4.90 each can be bought with £20?

.....
.....

[2]

- (b) What fraction of the following shape is **not** shaded.
Give your answer in its simplest terms.



.....
.....

[2]

- (c) (i) Write,

30% as a decimal,

$\frac{1}{4}$ as a decimal.

[2]

- (ii) Write $\frac{1}{4}$, 30% and 0.2 in order of size, with the smallest first.

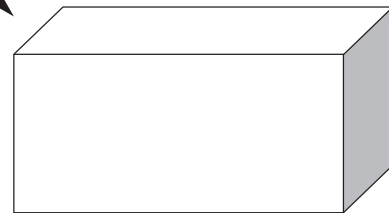
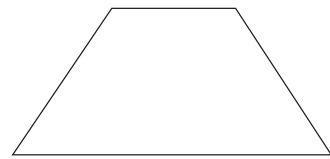
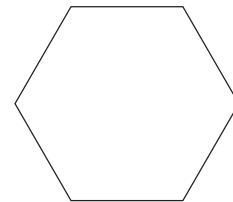
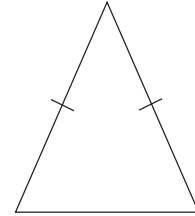
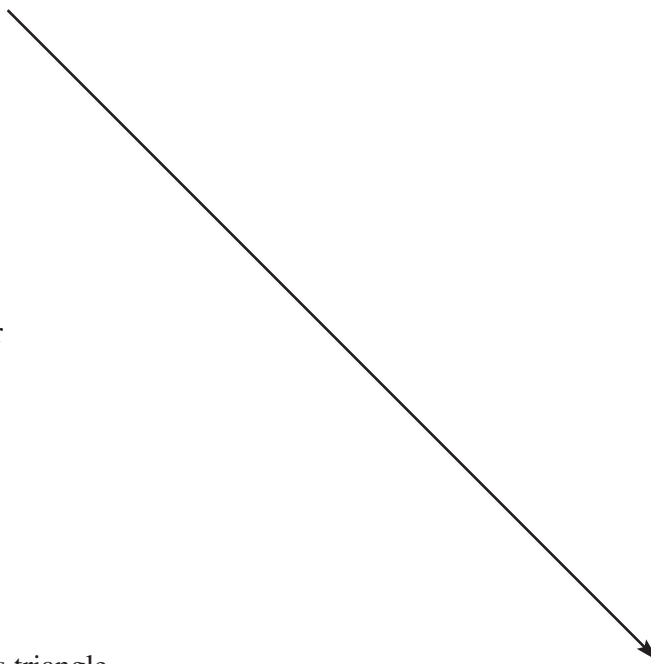
.....

[1]

3. Draw a line connecting each of the following words to the correct shape.
The first one has been done for you.

[4]

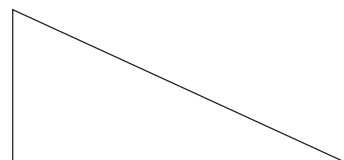
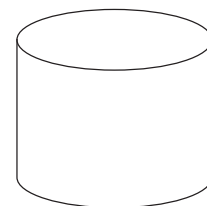
Cuboid



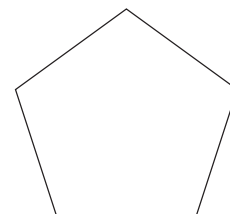
Cylinder

Isosceles triangle

Pentagon



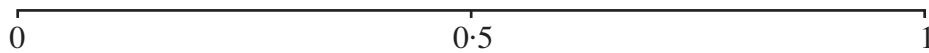
Parallelogram



Turn over.

4. Using the probability scale below mark the points **A**, **B** and **C** where;
- A** is the probability that there will be snow at the North Pole in January,
 - B** is the probability that it will rain in the Sahara desert tomorrow,
 - C** is the probability that the score will be a 2 when an ordinary dice is rolled.

[3]



5. Find the total cost of 64 tickets each costing £7.80.

.....

.....

.....

.....

.....

.....

.....

.....

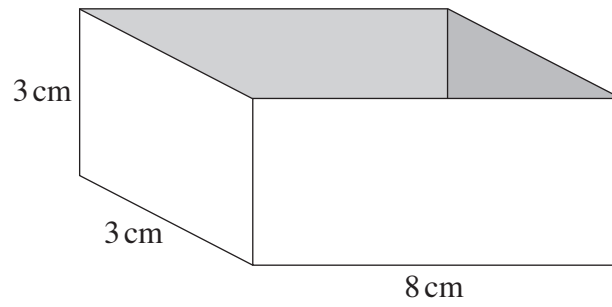
.....

.....

.....

[3]

6. Draw an accurate net for the **open box** sketched below.



One face has been drawn for you.

[3]



7. Describe **in words** the rule for continuing **each** of the following sequences.

(a) 57, 51, 45, 39,

Rule:

.....

[1]

(b) 1, 4, 16, 64,

Rule:

.....

[1]

8. Find the size of the angle marked x .
You must show all your working.

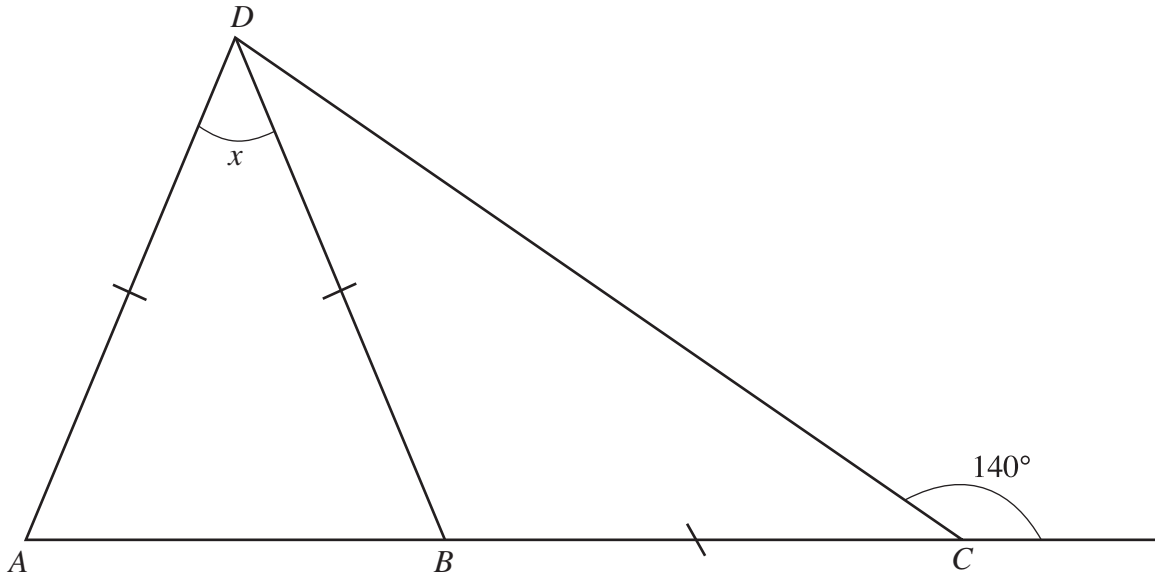


Diagram not drawn to scale

.....

.....

.....

.....

.....

.....

$$x = \text{.....}^\circ$$

[4]

Turn over.

9. (a) Write down the value of 4^2 .

..... [1]

- (b) Rhys earns £400 in his part-time job.
He is given a pay rise of 5%.
How much money is this pay rise?

..... [2]
.....
.....
.....

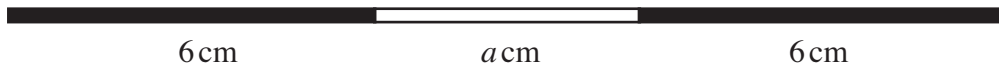
- (c) Two Brunei dollars are worth £1.
A gift costs 19 Brunei dollars.
How much is this in £s?

..... [2]
.....
.....
.....

10. (a) (i) A roll of curtain material is 30 metres long.
Julie buys y metres of the material.
Write down, in terms of y , the length of material that is left on the roll.

..... [1]

- (ii) A rod of length a cm is placed in between two rods each of length 6 cm as shown in the diagram.



Write down, in terms of a , the total length of the 3 rods.

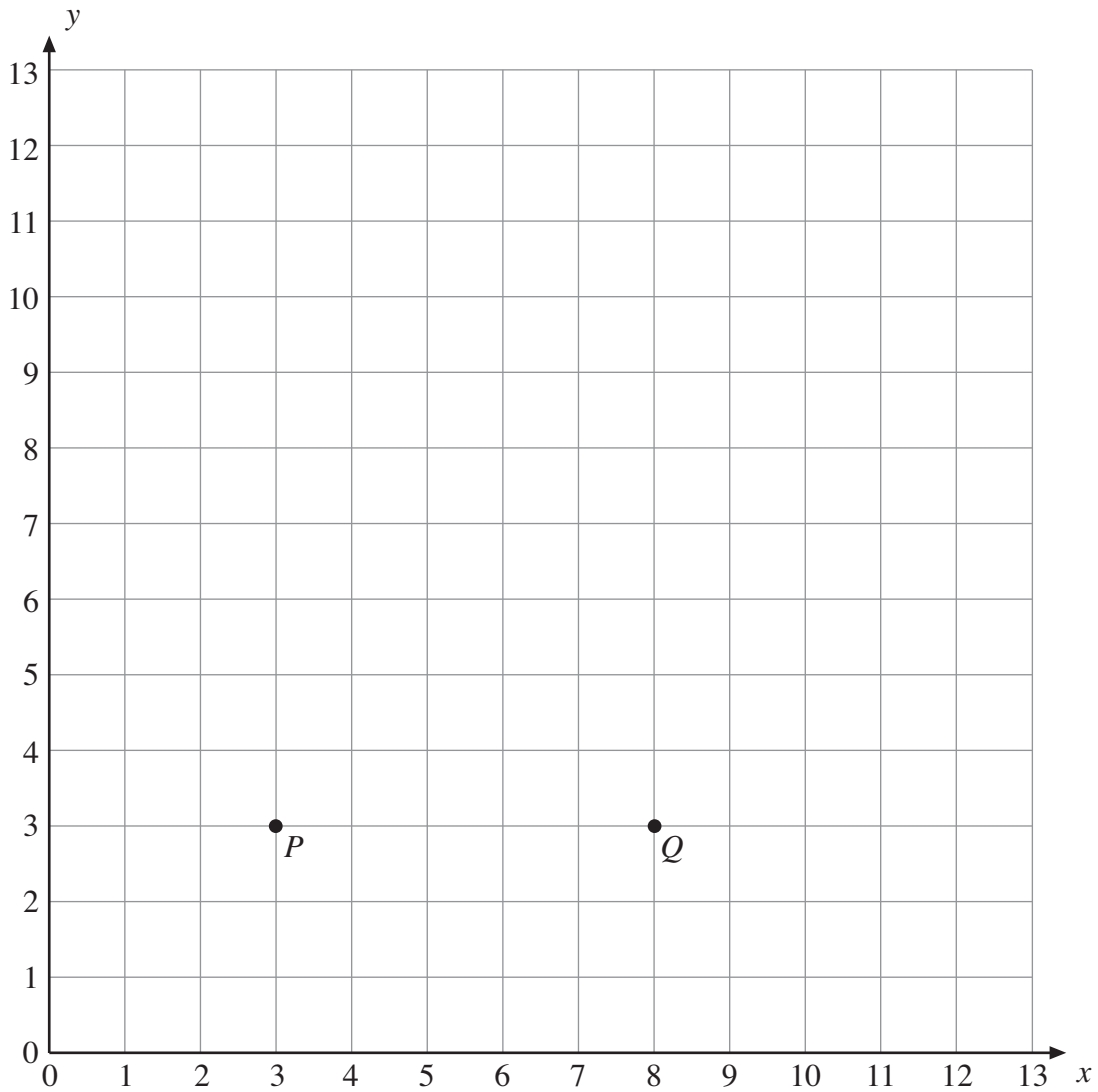
..... [1]

- (b) Solve $3x + 5 = 11$.

.....
.....
.....
.....

[2]

12.



The points $P(3, 3)$ and $Q(8, 3)$ are shown, on a centimetre square grid, on the above diagram. Another three points R , S and M are to be marked on this square grid. $PQRS$ is a parallelogram. The point M is the mid-point of PR .

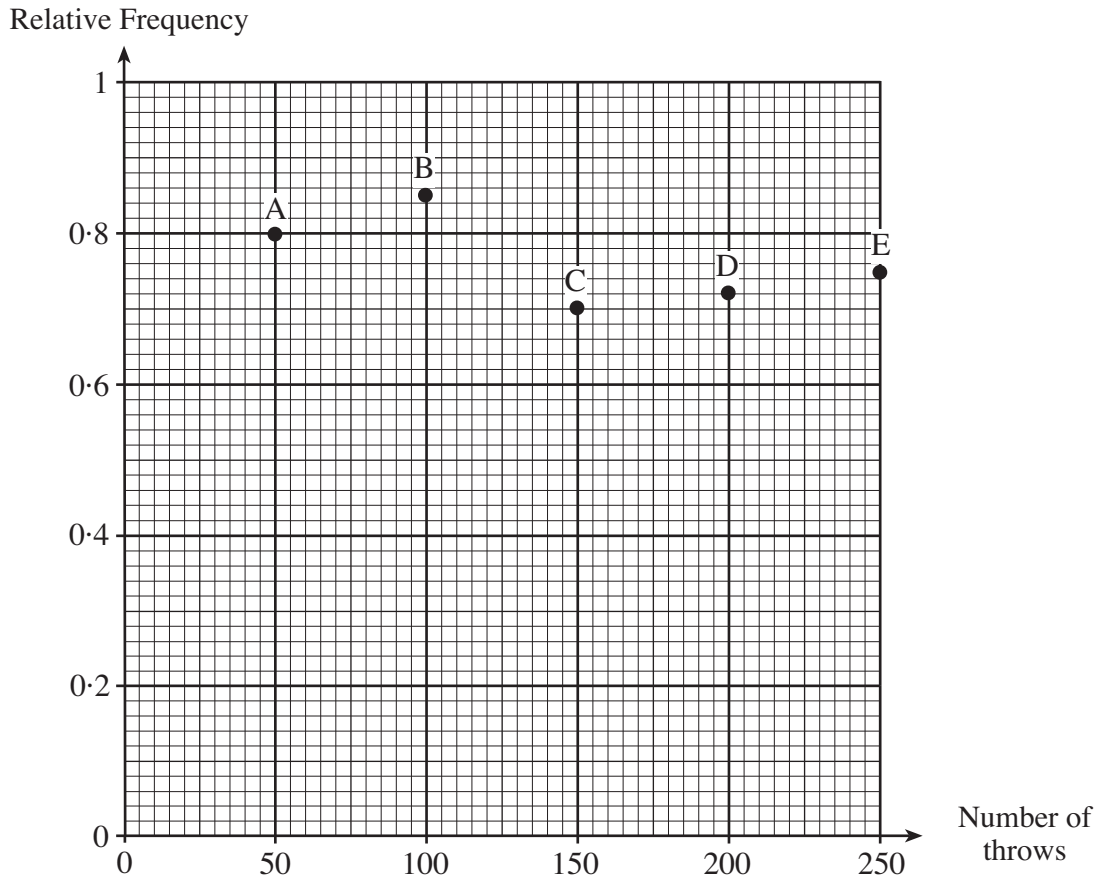
Write down a possible set of coordinates for the points R , S and M .

R (..... ,) S (..... ,) M (..... ,)

[4]

Turn over.

14. A biased coin was tossed.
The relative frequency of throwing a “Head” was calculated after a total of 50 throws, 100 throws, 150 throws, 200 throws and 250 throws.
The results were plotted on the graph below.



- (a) Which **one** of the readings noted by the letters A, B, C, D and E on the graph is likely to give the best estimate of the probability of throwing a “Head” with this coin?
You must give a reason for your answer.

.....

.....

.....

.....

.....

[2]

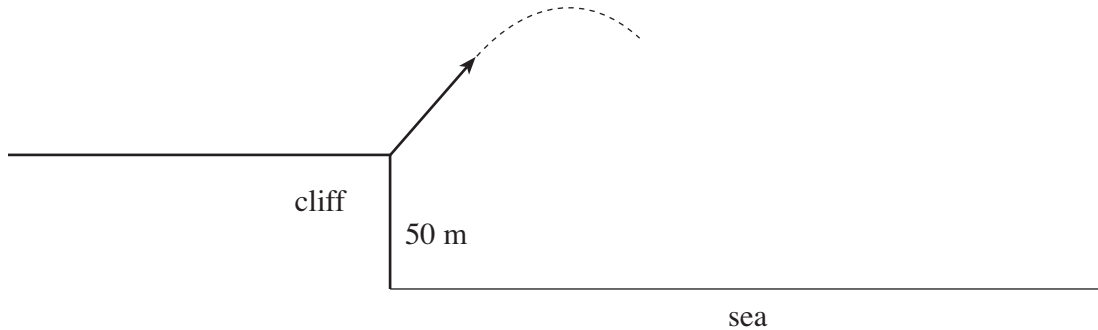
- (b) Using the graph, find how many “Heads” were obtained in the first 50 throws,

.....

[1]

Turn over.

15. A stone is propelled into the air towards the sea from the top of a cliff that is 50 metres above the sea.



When the stone has been in the air for t seconds, its height above sea level, h metres, is given by $h = 24t - 5t^2 + 50$.

- (a) Complete the table below which gives the height of the stone above sea level for values of t , by finding the value of h when $t = 2$.

t	0	1	2	3	4	5	6	7
$h = 24t - 5t^2 + 50$	50	69		77	66	45	14	-27

.....
 [1]

- (b) On the graph paper opposite, draw the graph of $h = 24t - 5t^2 + 50$ for values of t between 0 and 7. [2]

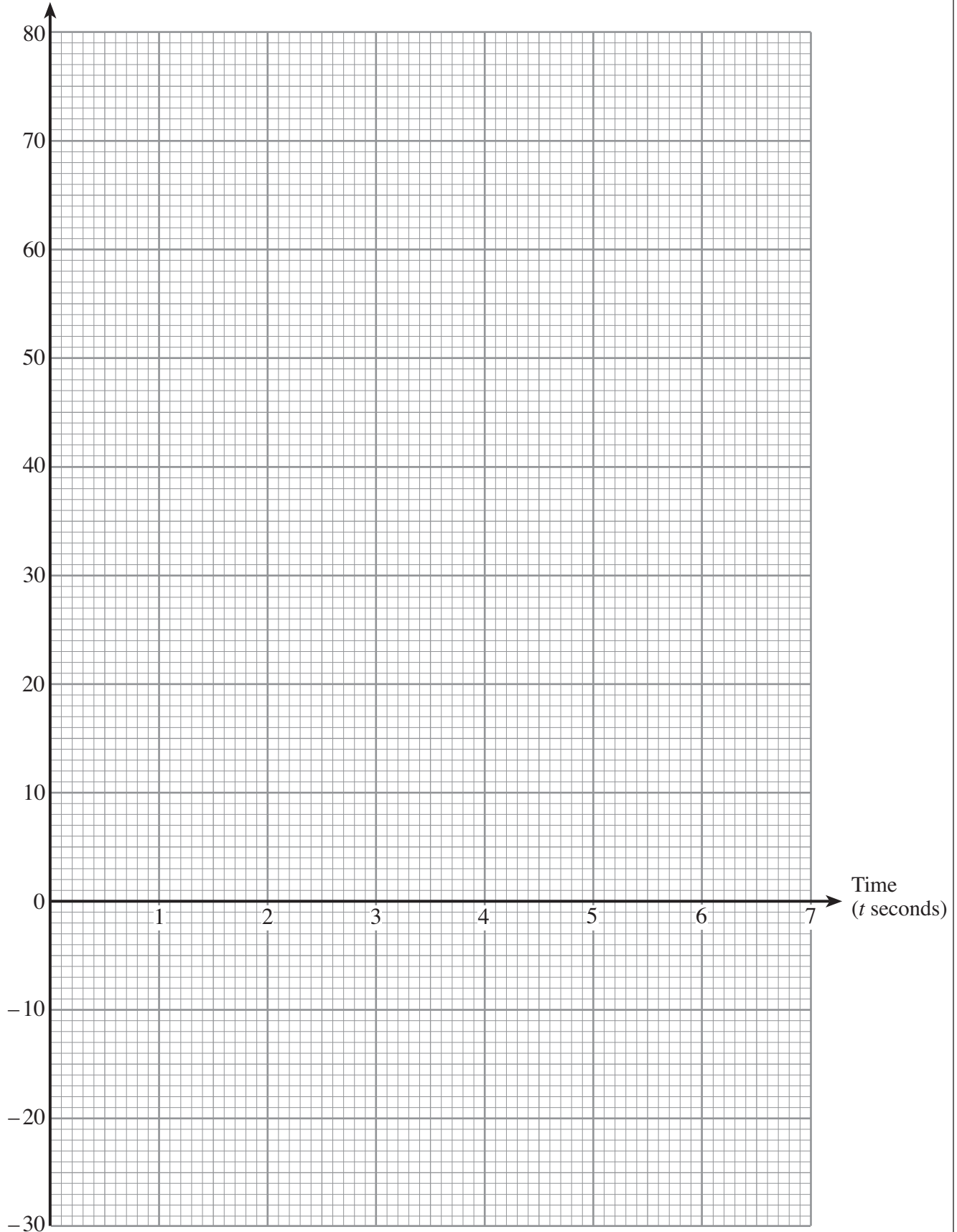
- (c) Write down the times when the stone is 10 metres above the cliff.

.....

 [2]

For use with question 15

Height (h metres) above sea level



Candidate Name	Centre Number	Candidate Number
		0

**GCSE****(UNITISED SCHEME)****MATHEMATICS****UNIT 2: NON-CALCULATOR MATHEMATICS****SPECIMEN PAPER****HIGHER TIER** $1\frac{1}{4}$ hours

**CALCULATORS ARE
NOT TO BE USED
FOR THIS PAPER**

INSTRUCTIONS TO CANDIDATES

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 $3\cdot14$.

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.

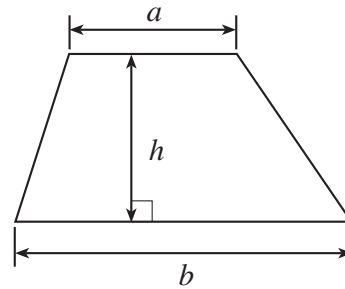
The number of marks is given in brackets at the end of each question or part-question.

You are reminded that assessment will take into account the quality of written communication (including mathematical communication) used in your answer to question 4.

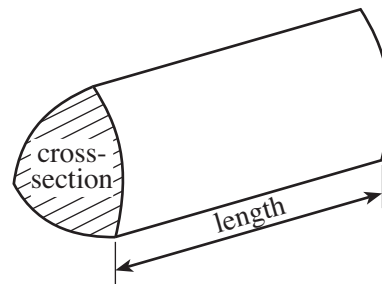
For Examiner's use only		
Question	Maximum Mark	Mark Awarded
1	5	
2	5	
3	4	
4	6	
5	4	
6	6	
7	5	
8	4	
9	2	
10	6	
11	4	
12	4	
13	7	
14	3	
TOTAL MARK		

Formula List

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

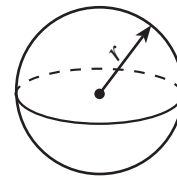


Volume of prism = area of cross-section \times length



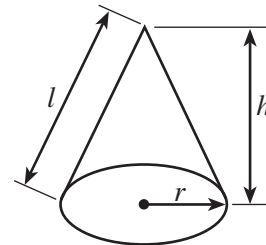
Volume of sphere = $\frac{4}{3} \pi r^3$

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



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

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

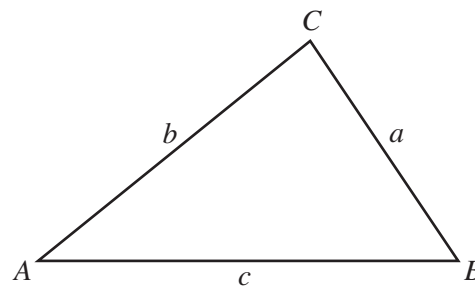


In any triangle ABC

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. (a) Write down the size of each of the angles marked x , y and z in the diagram.

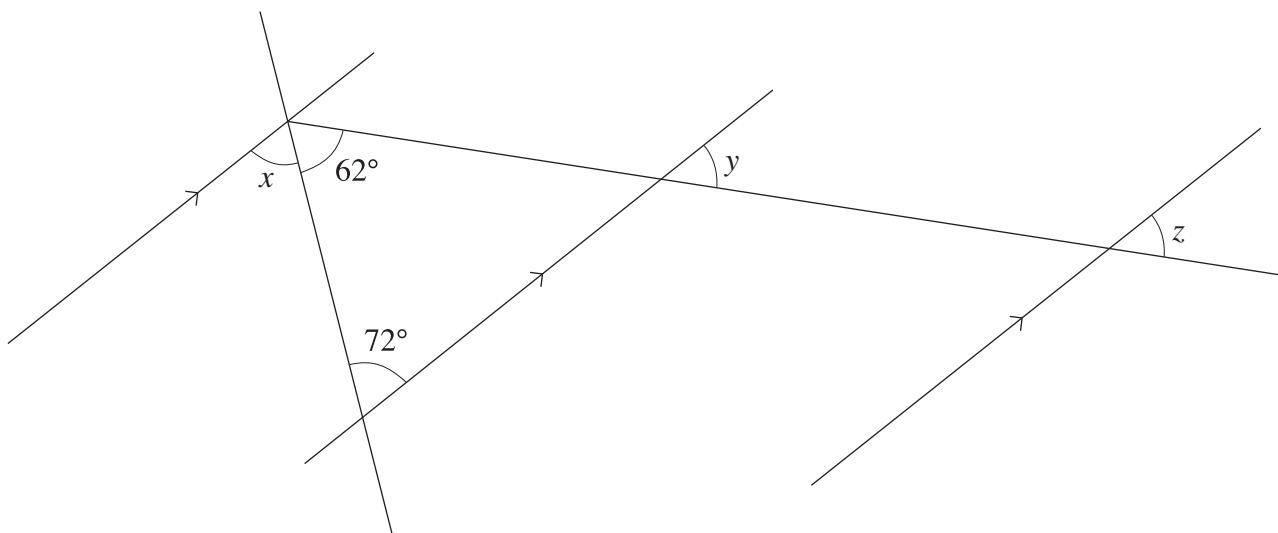


Diagram not drawn to scale.

$x = \dots\dots\dots^\circ$
 $y = \dots\dots\dots^\circ$
 $z = \dots\dots\dots^\circ$

[3]

- (b) Find the value of the angle marked z .

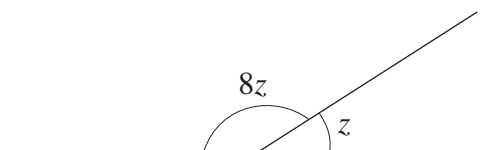


Diagram not drawn to scale.

.....

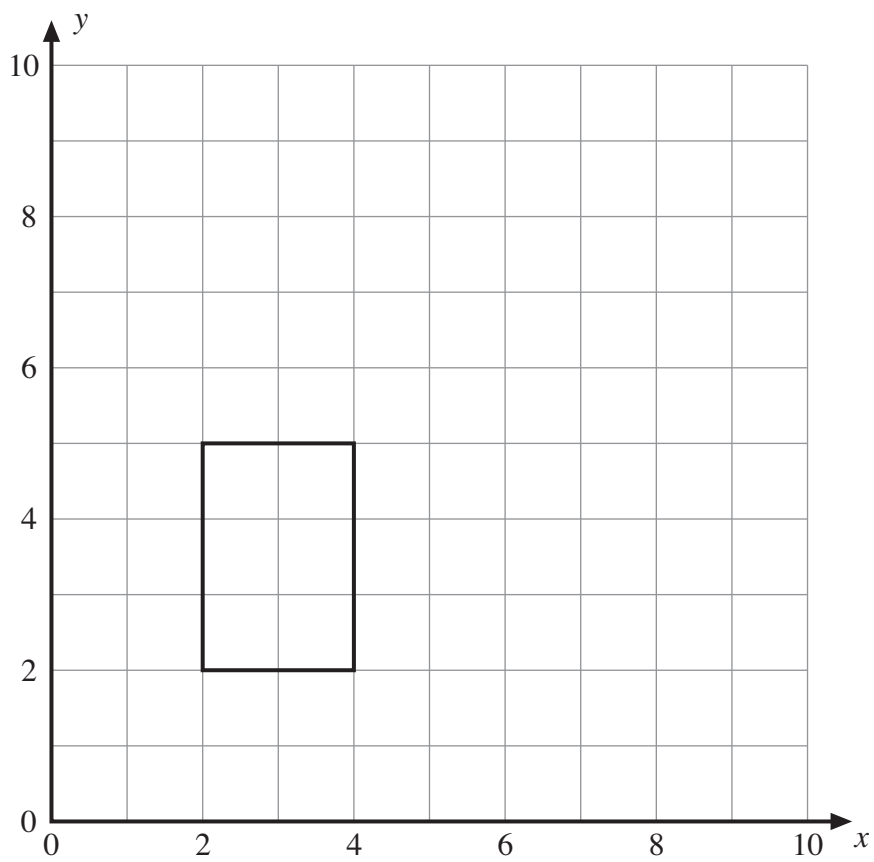
$z = \dots\dots\dots^\circ$

[2]

Turn over.

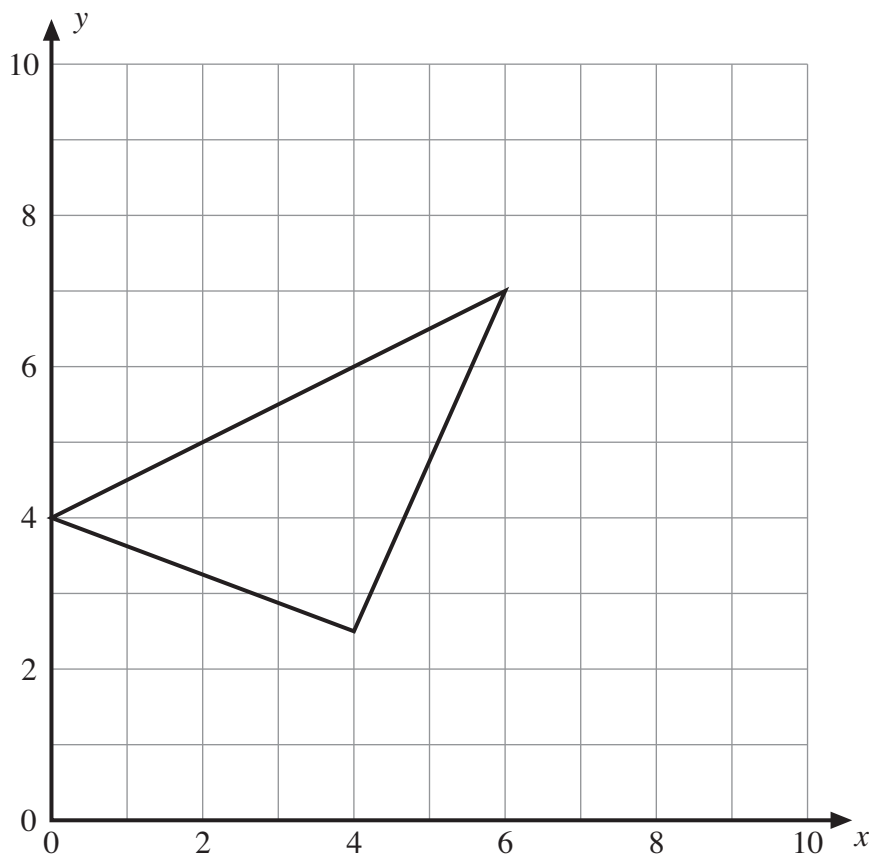
2. (a) Translate the rectangle shown 3 units to the right and 2 units up.

[1]



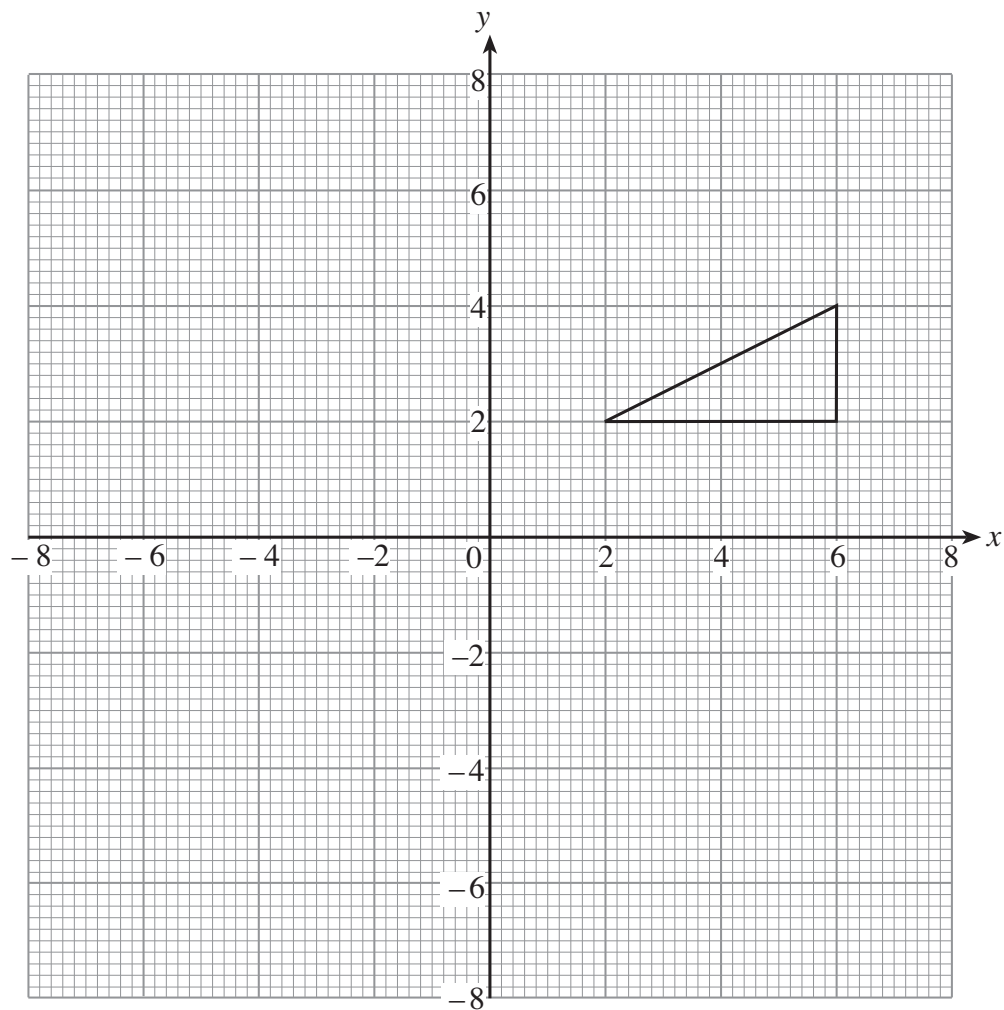
- (b) Draw the reflection of the triangle shown in the line $y = 5$.

[2]

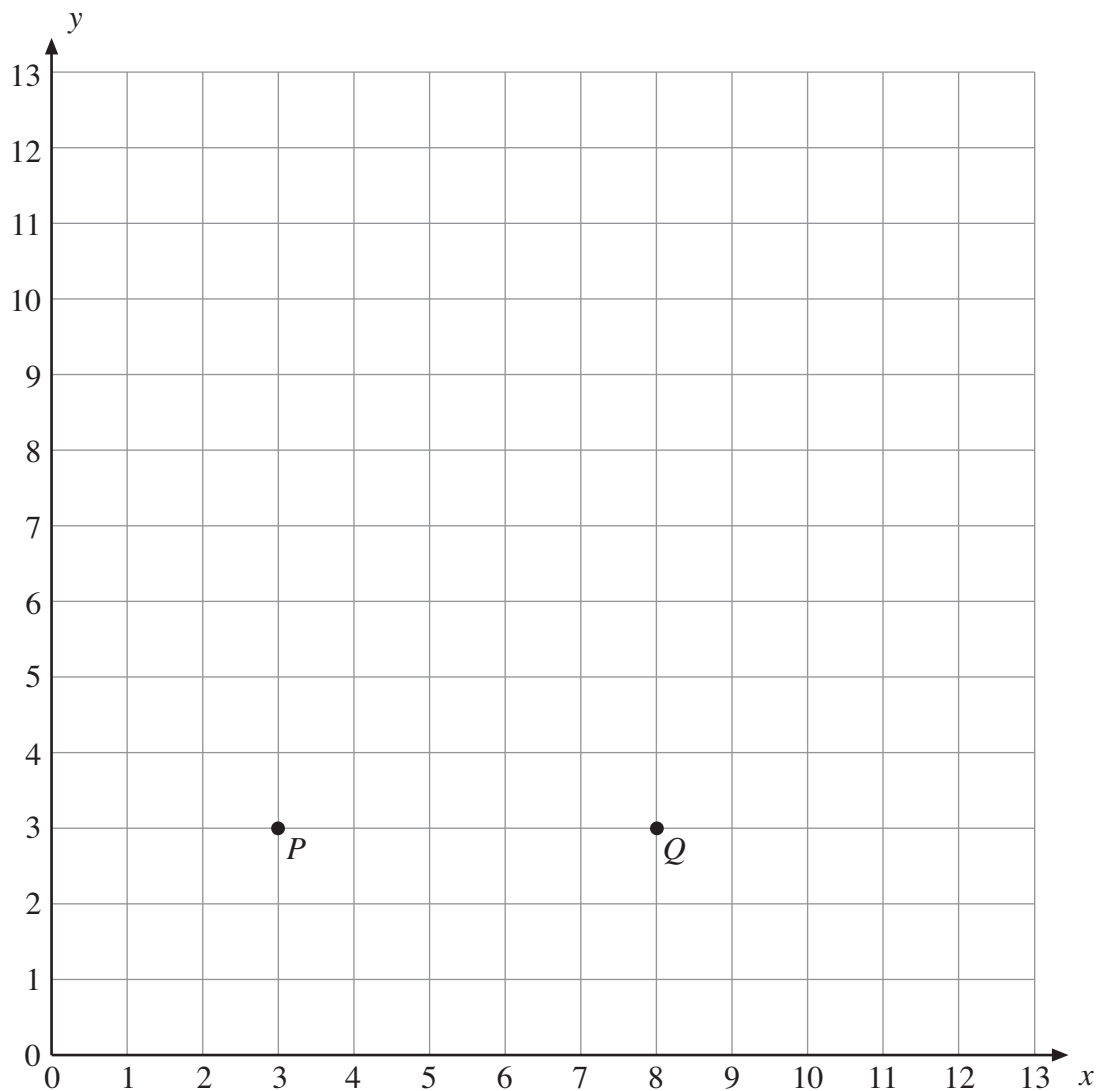


(c) Rotate the triangle through 90° clockwise about the point $(1, 2)$.

[2]



5.



The points $P(3, 3)$ and $Q(8, 3)$ are shown, on a centimetre square grid, on the above diagram. Another three points R , S and M are to be marked on this square grid. $PQRS$ is a parallelogram. The point M is the mid-point of PR .

Write down a possible set of coordinates for the points R , S and M .

R (..... ,)

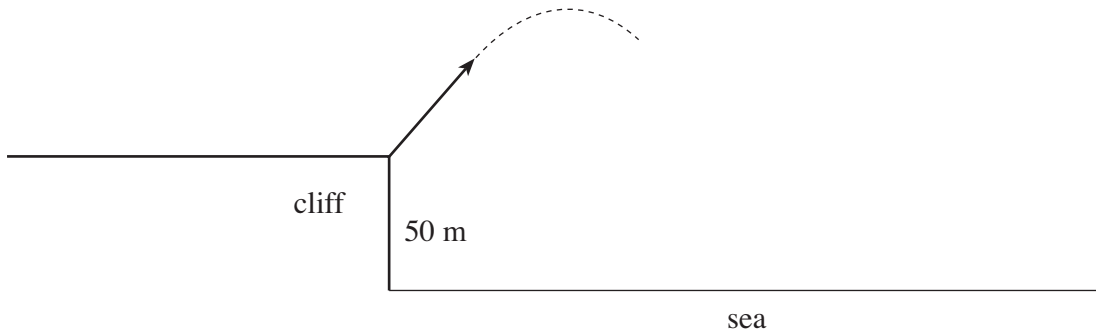
S (..... ,)

M (..... ,)

[4]

Turn over.

6. A stone is propelled into the air towards the sea from the top of a cliff that is 50 metres above the sea.



When the stone has been in the air for t seconds, its height above sea level, h metres, is given by $h = 24t - 5t^2 + 50$.

The table below gives the height of the stone above sea level for values of t .

t	0	1	2	3	4	5	6	7
$h = 24t - 5t^2 + 50$	50	69	78	77	66	45	14	-27

- (a) On the graph paper opposite, draw the graph of $h = 24t - 5t^2 + 50$ for values of t between 0 and 7. [2]

- (b) Write down the times when the stone is 10 metres above the cliff.

.....

.....

.....

.....

[2]

- (c) Find the time from which the formula for h should not be used and explain why.

.....

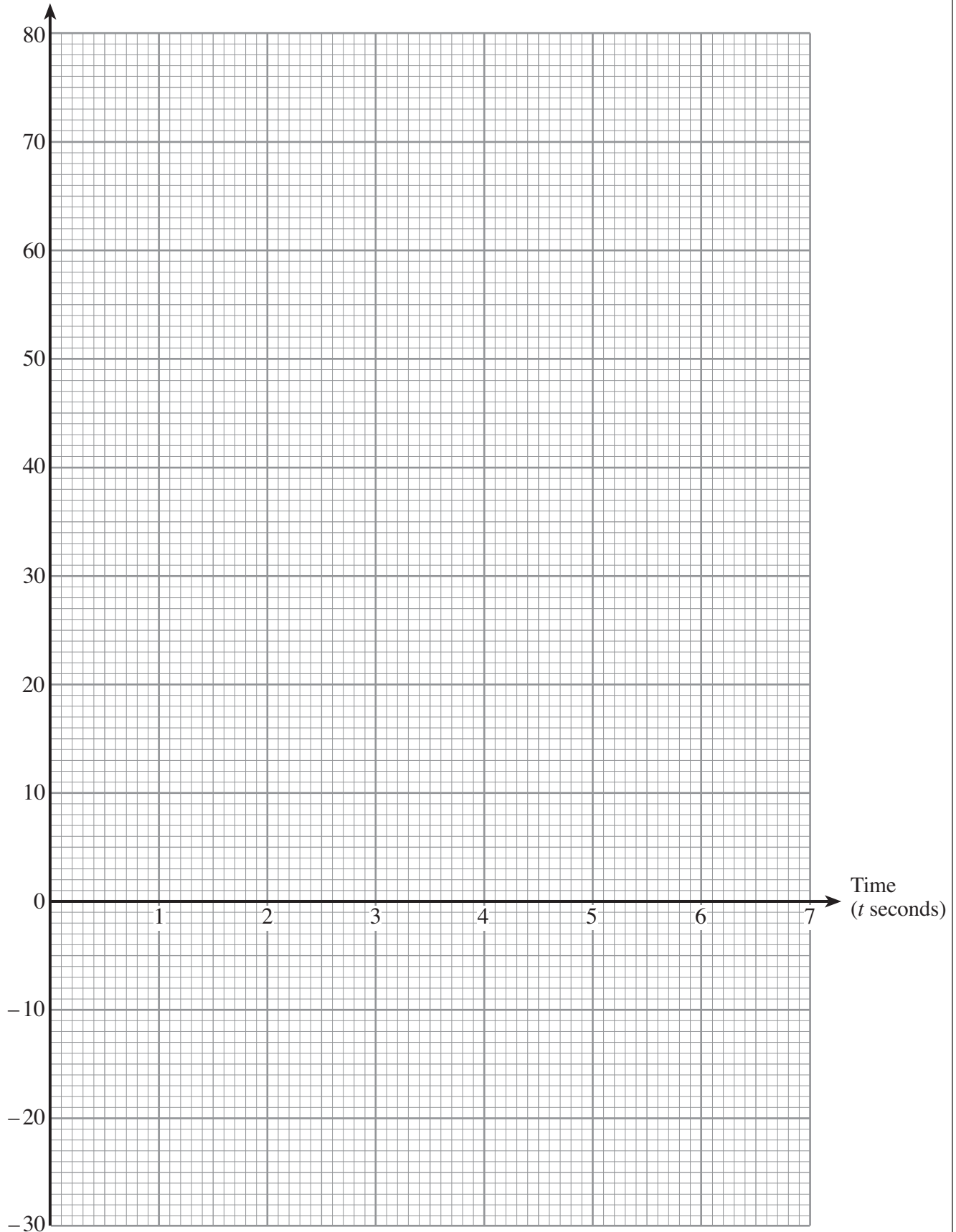
.....

.....

[2]

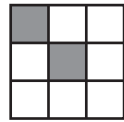
For use with question 6

Height (h metres) above sea level

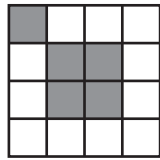


Turn over.

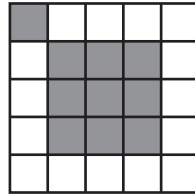
7. The diagrams show tile patterns.
Each pattern has some shaded tiles and some white tiles.



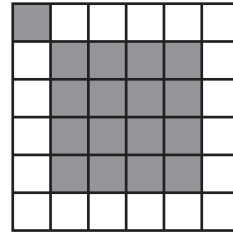
Pattern 1



Pattern 2



Pattern 3



Pattern 4

Find an expression for the number of shaded tiles in Pattern n and an expression for the number of white tiles in Pattern n .

.....

.....

.....

.....

.....

.....

.....

.....

.....

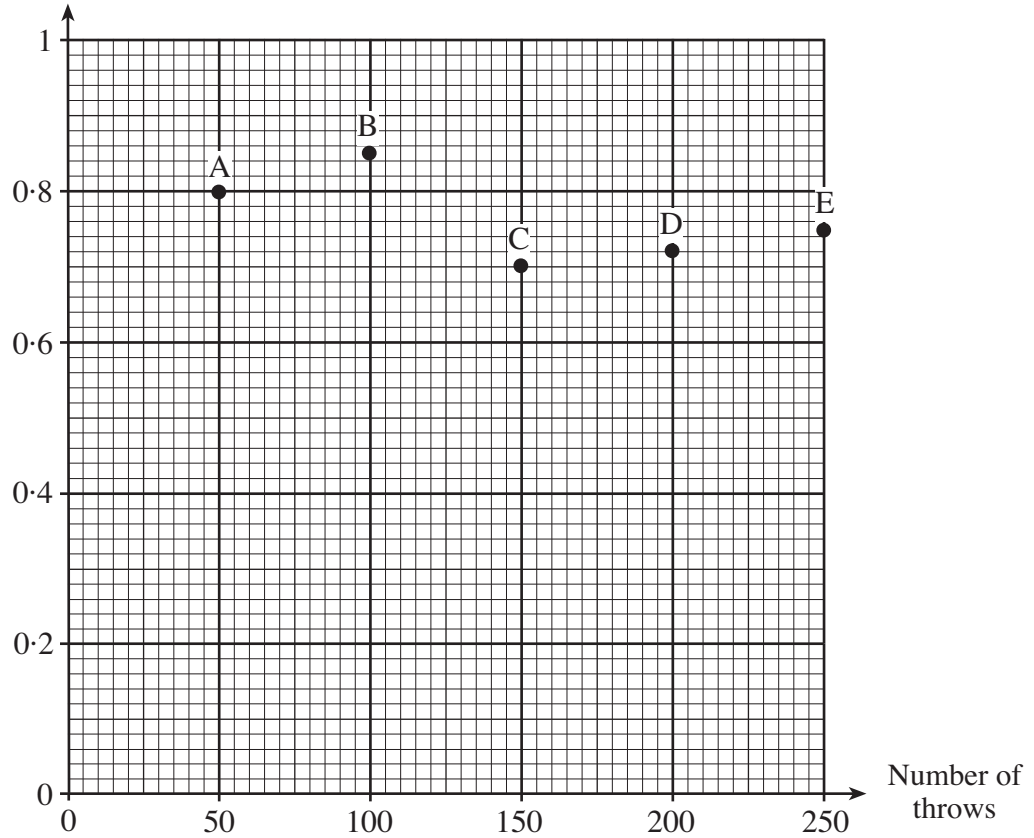
.....

[5]

BLANK PAGE

8. (a) A biased coin was tossed. The relative frequency of throwing a “Head” was calculated after a total of 50 throws, 100 throws, 150 throws, 200 throws and 250 throws. The results were plotted on the graph below.

Relative Frequency



Which **one** of the readings noted by the letters A, B, C, D and E on the graph is likely to give the best estimate of the probability of throwing a “Head” with this coin? You must give a reason for your answer.

.....

.....

.....

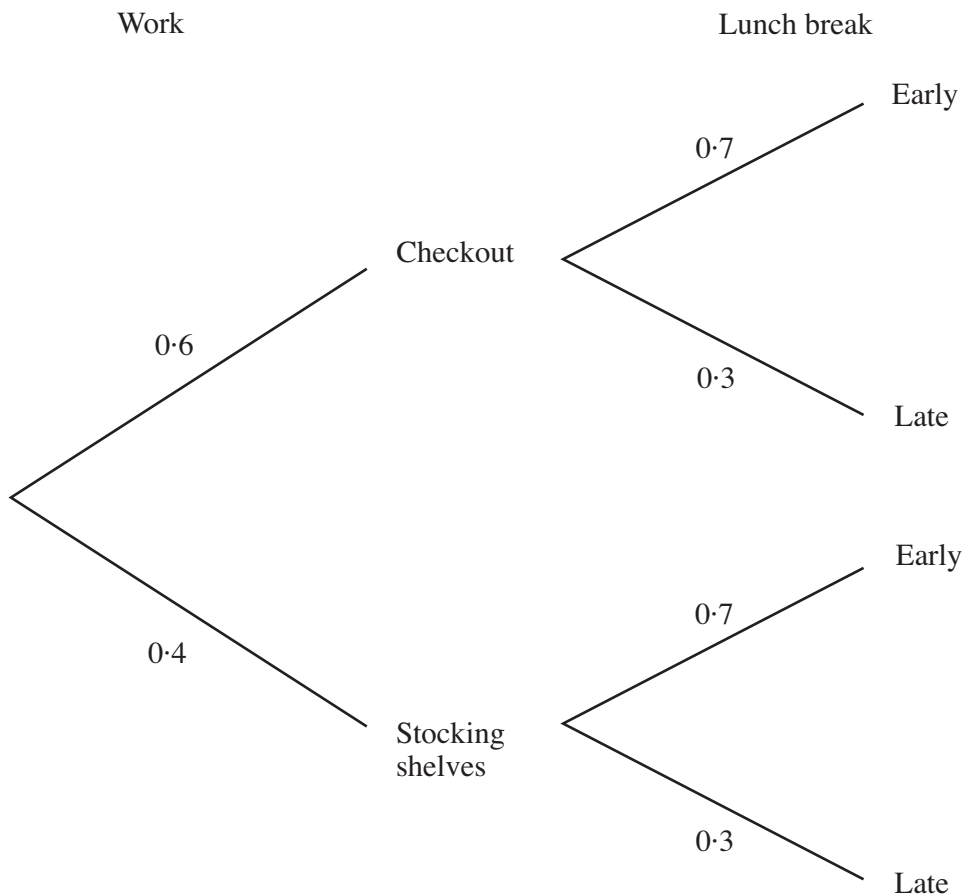
.....

.....

.....

.....

- (b) Gethin is employed in a shop. Either he works on the checkout or he stocks shelves. The probability that he works on the checkout is 0.6. When Gethin arrives at work he is told whether he has either an early lunch break or a late lunch break. The probability that he is given a late lunch break is 0.3. The type of work done and the time of the lunch break are independent.



Calculate the probability that Gethin works on the checkout and has an early lunch break.

.....

.....

.....

.....

[2]

9. Express the following numbers in standard form.

(a) 345 000

.....

[1]

(b) 0.0000782

.....

[1]

Turn over.

10. Three dogs and two cats weigh 127 kg.
Four dogs and three cats weigh 174 kg.
All the dogs weigh the same and all the cats weigh the same.
What do three dogs and one cat weigh?

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

[6]

BLANK PAGE

11. (a) Four points A , B , C and D lie on the circumference of a circle. The lines AC and BD intersect at the point F .

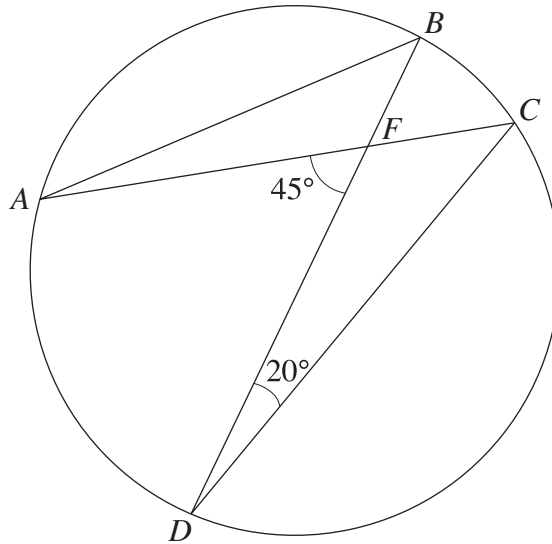


Diagram not drawn to scale.

Find the size of $\hat{A}BD$ giving a reason for your answer.

.....

.....

.....

.....

[2]

- (b) Three points P , Q and R lie on the circumference of a circle.
The tangent XY touches the circle at R .

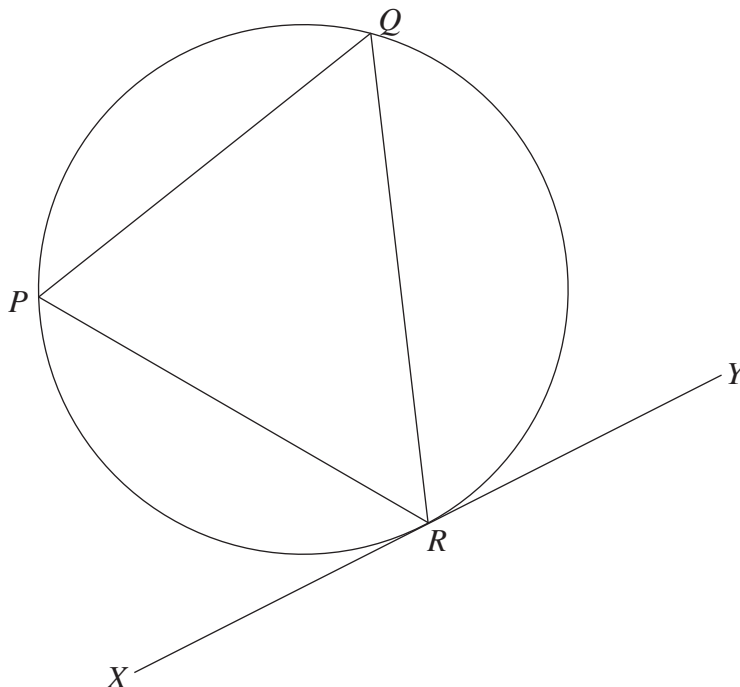


Diagram not drawn to scale.

Given that $\widehat{RPQ} = 70^\circ$ and $\widehat{PQR} = 68^\circ$, find the size of \widehat{PRX} giving a reason for your answer.

.....

.....

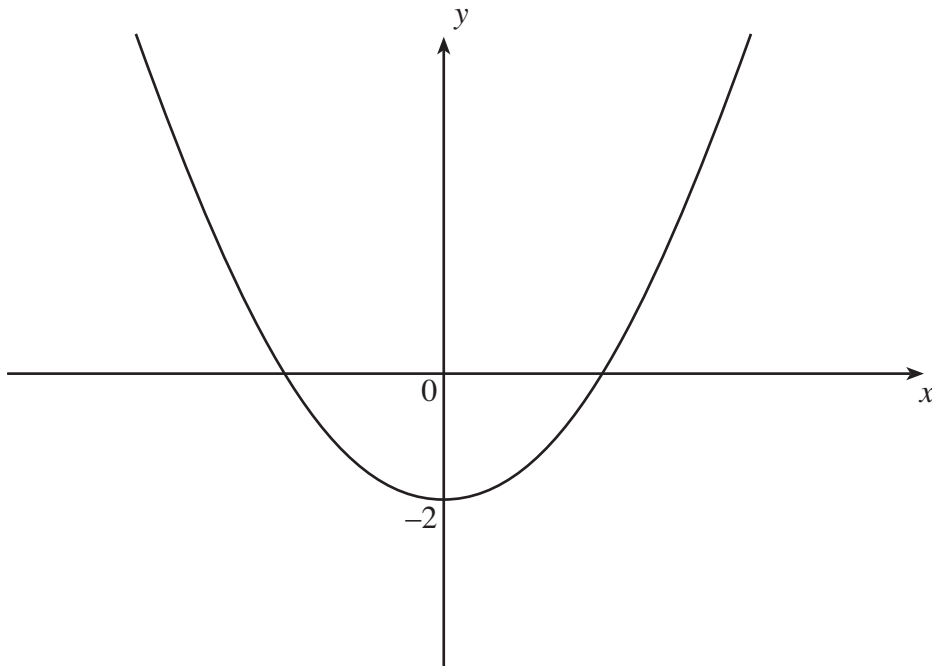
.....

.....

[2]

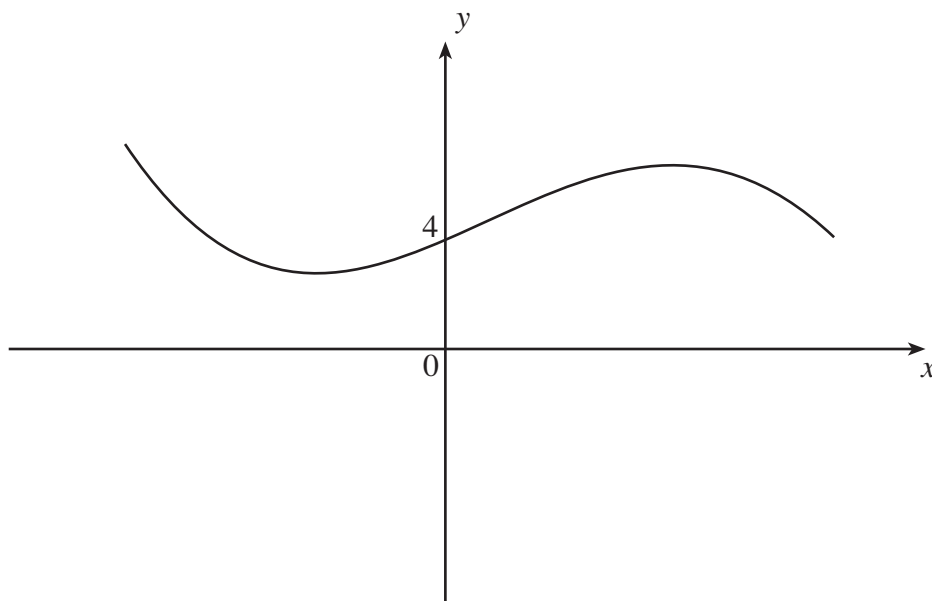
12. (a) The diagram shows a sketch of $y = f(x)$.
On the same diagram, sketch the curve $y = f(2x)$.
Mark clearly the value of y at the point where this curve crosses the y -axis.

[2]



- (b) The diagram shows a sketch of $y = g(x)$.
On the same diagram, sketch the curve $y = -g(x)$.
Mark clearly the value of y at the point where this curve crosses the y -axis.

[2]



13. (a) Make g the subject of the following formula.

$$\frac{3e(g+4)}{7-g} = 2$$

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

[4]

- (b) Find the value of $(\sqrt{32} - \sqrt{2})^2$.

.....

.....

.....

.....

[3]

Candidate Name	Centre Number	Candidate Number

**GCSE****(UNITISED SCHEME)****MATHEMATICS****UNIT 3: CALCULATOR-ALLOWED MATHEMATICS****SPECIMEN PAPER****FOUNDATION TIER** $1\frac{1}{2}$ hours**ADDITIONAL MATERIALS**

A calculator will be required for this paper.

INSTRUCTIONS TO CANDIDATES

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.

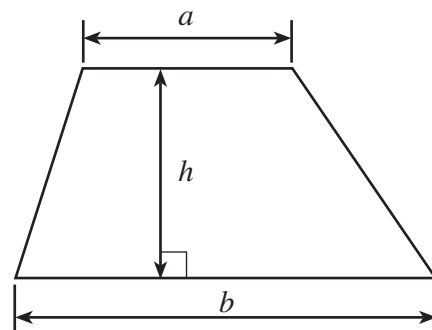
The number of marks is given in brackets at the end of each question or part-question.

You are reminded that assessment will take into account the quality of written communication (including mathematical communication) used in your answer to question **14**.

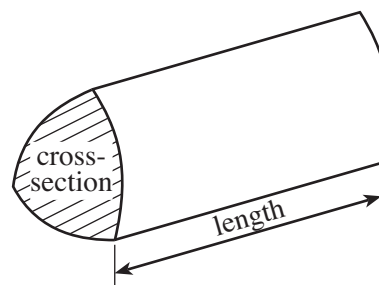
For Examiner's use only		
Question	Maximum Mark	Mark Awarded
1	3	
2	10	
3	7	
4	4	
5	3	
6	4	
7	7	
8	5	
9	6	
10	4	
11	4	
12	4	
13	2	
14	6	
15	4	
16	7	
TOTAL MARK		

Formula List

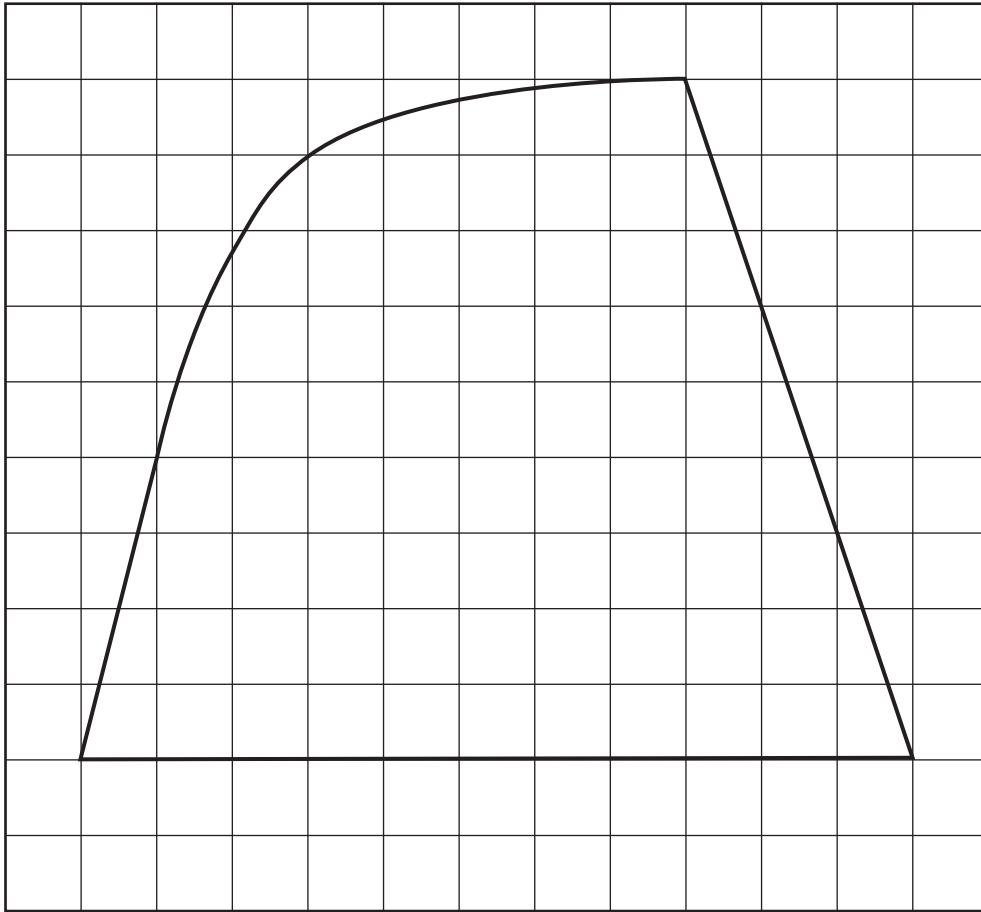
Area of trapezium = $\frac{1}{2}(a + b)h$



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



1.



The above shape, drawn on a square grid, represents a field. Estimate the area of the field if every square represents an area of 10 m^2 .

.....

.....

.....

.....

[3]

2. (a) Complete the following bill.

Item	Cost
5kg of carrots @ 68p per kg	£ 3.40
3 boxes of sugar cubes @ 67p each	£
4 bags of potatoes @ £1.99 per bag	£
4 tins salmon @ £2.31 per tin	£
Total	£

[4]

- (b) Haydn has a £10 note.
He buys Gourmet cat food costing £3.88 and Boneo dog food costing £5.29.
How much money should Haydn have left?

.....

.....

.....

.....

.....

[2]

- (c) Find the value of each of the following.

(i) $\frac{1}{5} + \frac{2}{5}$

.....

.....

[1]

(ii) $\frac{1}{2} + \frac{1}{4}$

.....

.....

[1]

(d) Using the following list of numbers.

46 74 36 48 43 56 24 41 62

write down

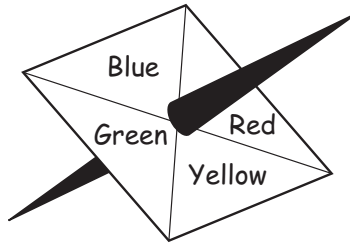
(i) a square number,

.....
[1]

(ii) the number which is 70 to the nearest 10.

.....
[1]

3.



A spinner can land on any of four equal sections coloured Blue (B), Red (R), Yellow (Y) and Green (G).

The spinner is spun 40 times and the results are shown below.

G	R	Y	B	G	G	R	B	G	B
Y	B	G	R	B	Y	G	Y	B	R
B	G	R	B	Y	R	B	G	R	G
Y	R	B	G	R	Y	G	G	B	Y

(a) Complete the frequency table below.

Colour	Tally	Frequency
B		
R		
Y		
G		

[2]

(b) Write down the mode.

[1]

- (c) Using the squared paper below, draw a suitable bar chart to illustrate the data given in the table.

[4]



4. Jane is older than Kim.
Kim is older than Shaun.
Shaun is younger than Jane.
Rachel is older than Jane.

Arrange the names of these people in the order of their age, giving the youngest first.

.....

.....

.....

.....

.....

.....

.....

.....

--	--	--	--

youngest oldest

[4]

5. (a) Find the value of $3p + 2$ when $p = 5$.

.....
..... [1]

- (b) Find the value of $3x + 5y$ when $x = -2$ and $y = 3$.

.....
.....
.....
..... [2]

6. Find the value of each of the following, giving each answer correct to one decimal place.

(a) $\frac{12 \cdot 9 + 13 \cdot 7}{17 \cdot 6}$

.....
..... [2]

(b) $\sqrt{16 \cdot 9 - 9 \cdot 72}$

.....
..... [2]

7. Two rectangles, each 9 cm by 3 cm overlap each other as shown in the diagram.

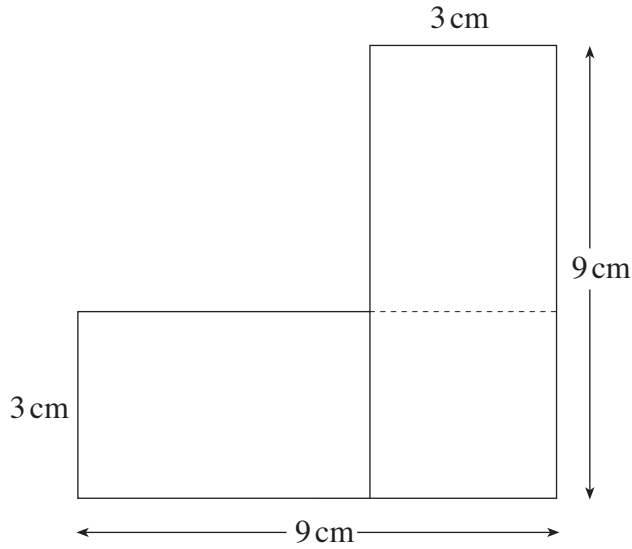


Diagram not drawn to scale.

(a) Calculate the perimeter of the complete shape.

.....

.....

.....

[3]

(b) Calculate the area of the complete shape.
Write down the units of your answer.

.....

.....

.....

.....

[4]

8. Megan's marks in seven subjects were:

86 60 72 54 35 66 54

(a) Find her mean score for these subjects.

.....

.....

.....

.....

[3]

(b) Find the median of these marks.

.....

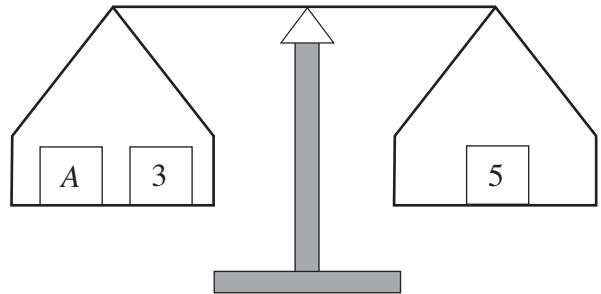
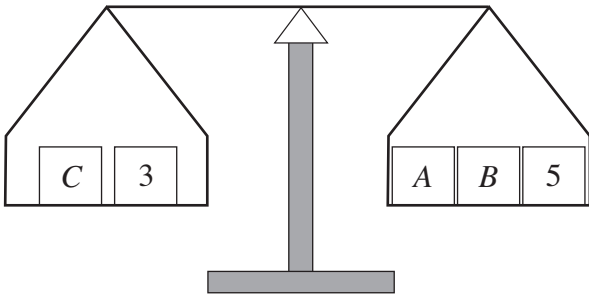
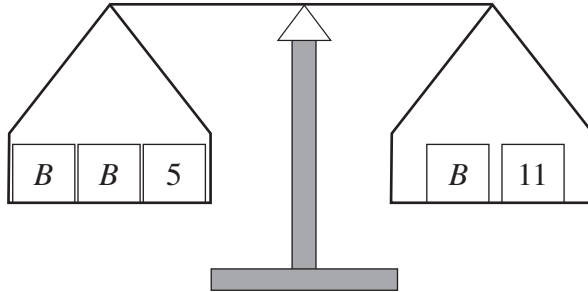
.....

.....

.....

[2]

9. Each diagram represents a balance with the total weight on each side being equal. Find the values of A , B and C .



.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

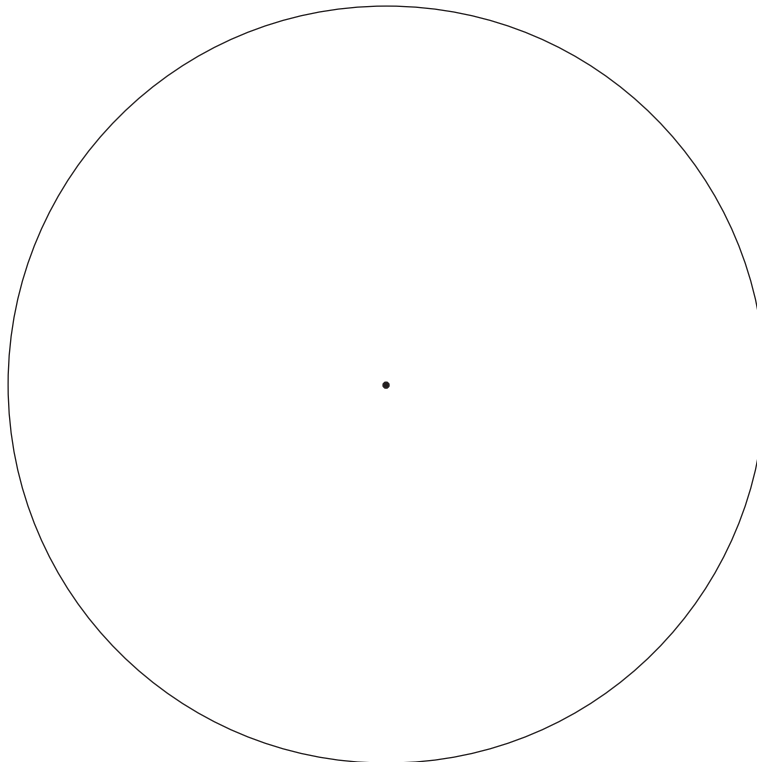
$A =$ $B =$ $C =$

[6]

10. The table shows the various classifications of films and the number of each type shown by the *View* cinema in 2007.

Classification	'PG'	'12'	'15'	'18'
Number of films shown	35	30	60	55

Draw a pie chart to illustrate this data. You should show how you calculate the angles of your pie chart.



View Cinema

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

[4]

Turn over.

- 11.** Kate buys 3.5 kg of pears and 2.5 kg of apples for £8.43.
The apples cost £1.58 per kg.
Find the cost of 1 kg of pears.

.....

.....

.....

.....

.....

.....

.....

.....

.....

[4]

12. Solve the equation $3(2 + x) = 11 + 5(3 - x)$.

.....

.....

.....

.....

.....

.....

.....

[4]

13. Two brothers share £80 in the ratio of 1 : 4. How much does each receive?

.....

.....

.....

.....

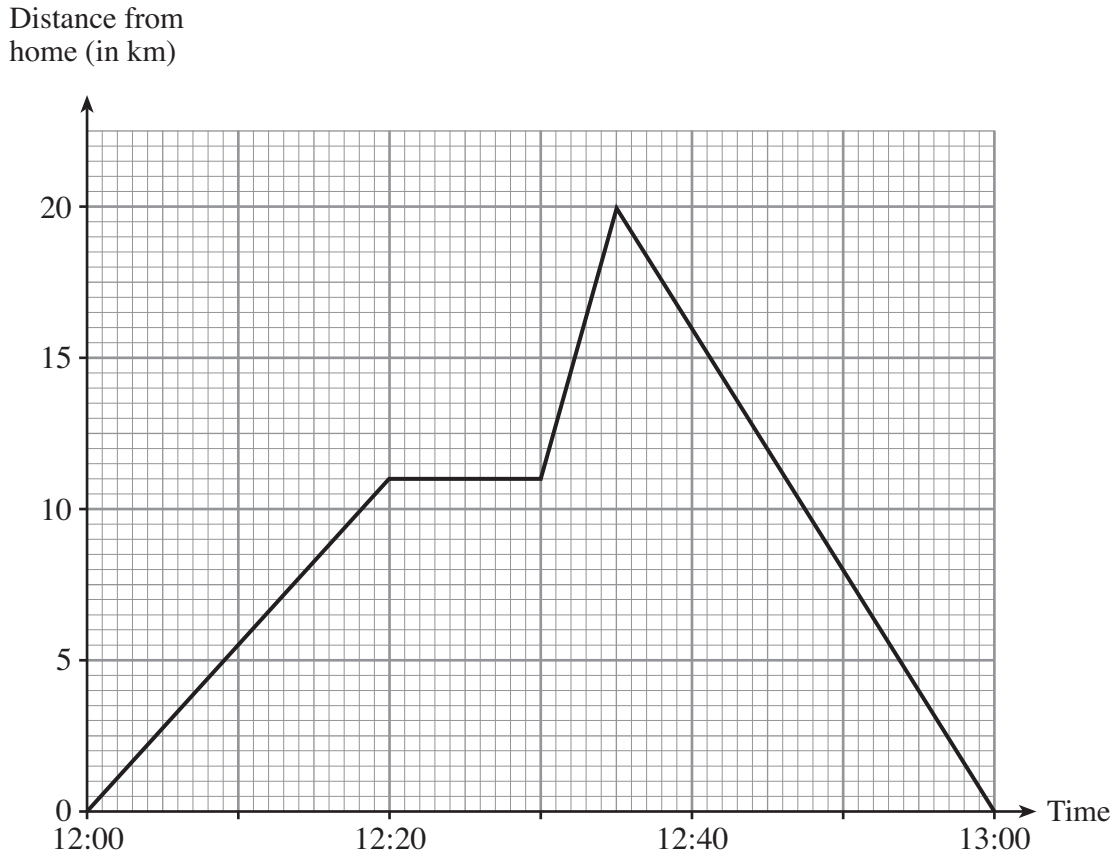
.....

.....

[2]

14. You will be assessed on the quality of your written communication in this question.

Deepa is looking at Fiona’s travel graph for a cycling journey she took starting out from home.



Deepa makes some claims:

- Fiona was travelling on flat ground between 12:20 and 12:30
- The graph shows that Fiona returned home at 13:00
- Fiona was cycling faster between 12:00 and 12:20 than between 12:35 and 13:00

Write a reply to Deepa’s claims, indicating, with reasons, whether each of her claims is true or not.

.....

.....

.....

.....

.....

.....

.....

.....

.....

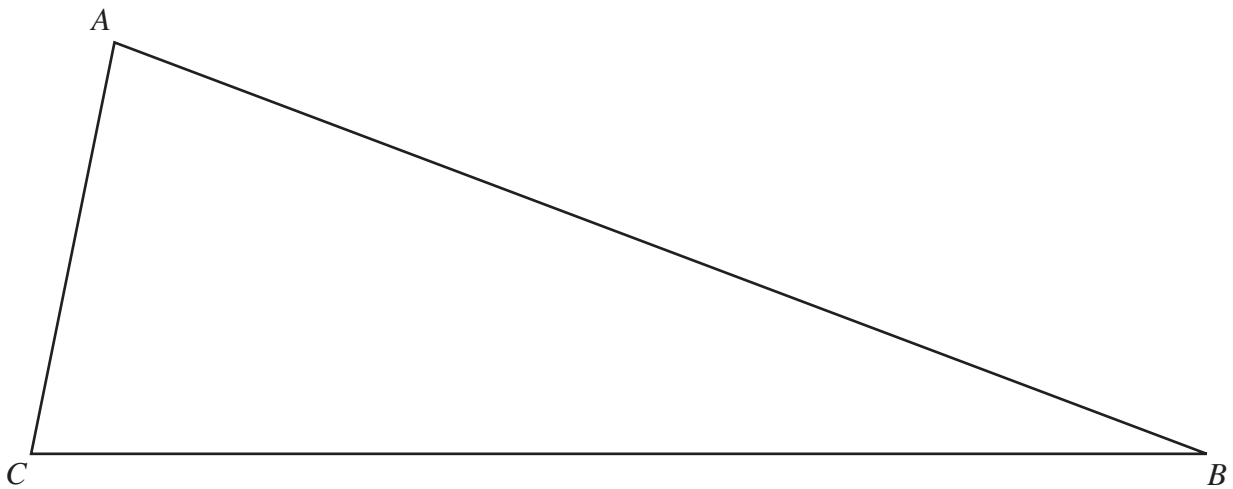
.....

15. Find and shade the region of points inside the triangle ABC that satisfy all of the following conditions.

The points are

- (i) nearer to A than to B ,
- (ii) nearer to BC than to AC ,
- (iii) further than 6 cm from C .

[4]



- (b) The volume of a cuboid is 240 cm^3 .
The height of the cuboid is 10 cm.
The length of the base is 5 cm longer than the width of the base.
Find the width of the base of the cuboid.

.....

.....

.....

.....

.....

.....

.....

.....

.....

[3]

Candidate Name	Centre Number	Candidate Number

**GCSE****(UNITISED SCHEME)****MATHEMATICS****UNIT 3: CALCULATOR-ALLOWED MATHEMATICS****SPECIMEN PAPER****HIGHER TIER** $1\frac{3}{4}$ hours**ADDITIONAL MATERIALS**

A calculator will be required for this paper.

INSTRUCTIONS TO CANDIDATES

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.

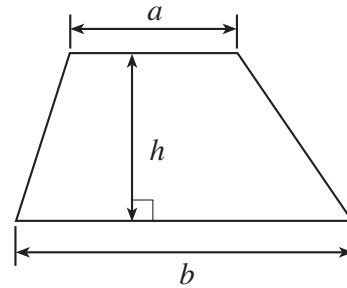
The number of marks is given in brackets at the end of each question or part-question.

You are reminded that assessment will take into account the quality of written communication (including mathematical communication) used in your answer to question 4.

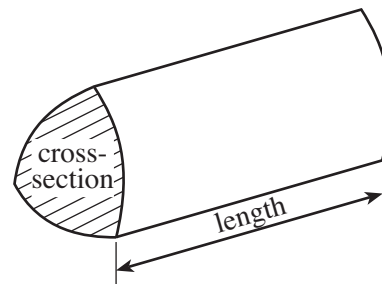
For Examiner's use only		
Question	Maximum Mark	Mark Awarded
1	3	
2	5	
3	8	
4	6	
5	6	
6	3	
7	7	
8	6	
9	4	
10	3	
11	7	
12	6	
13	5	
14	4	
15	4	
16	7	
17	6	
TOTAL MARK		

Formula List

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

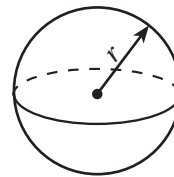


$$\text{Volume of prism} = \text{area of cross-section} \times \text{length}$$



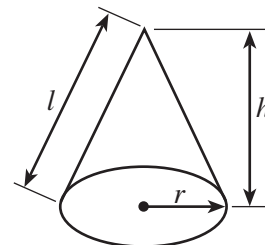
$$\text{Volume of sphere} = \frac{4}{3} \pi r^3$$

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



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

$$\text{Curved surface area of cone} = \pi r l$$

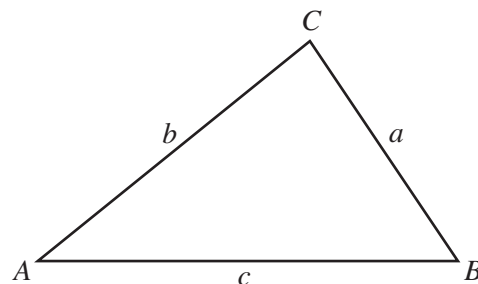


In any triangle ABC

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

$$\text{Cosine rule} \quad a^2 = b^2 + c^2 - 2bc \cos A$$

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



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. When $t = 5$, $u = -\frac{1}{2}$ and $w = -2$ find the value of

(a) $\frac{4t - 2w}{3}$,

.....

.....

.....

.....

.....

[2]

(b) u^2 .

.....

.....

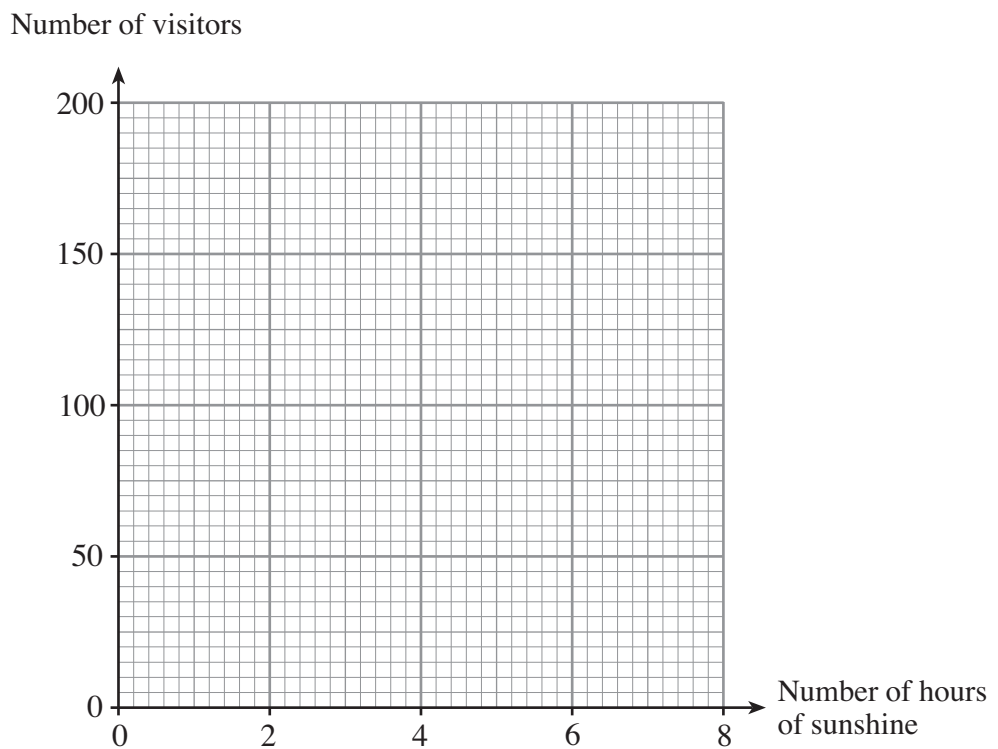
[1]

2. The number of visitors to a nature park and number of hours of sunshine were recorded each Saturday for 6 weeks. The table below shows the results.

Number of hours of sunshine	3.5	7.5	4.0	4.0	4.5	6.0
Number of visitors	92	170	104	110	115	145

- (a) On the graph paper provided draw a scatter diagram of these results.

[2]



- (b) Describe the correlation between the number of hours of sunshine and the number of visitors to the nature park.

[1]

- (c) Draw by eye a line of best fit on your scatter diagram.

[1]

- (d) Find an estimate for the number of visitors to the nature park on a day with 5 hours of sunshine.

[1]

3. (a) Two brothers share £80 in the ratio of 1 : 4. How much does each brother receive?

.....

.....

.....

.....

.....

[2]

- (b) To make pink paint, red paint and white paint are mixed together in the ratio 2 : 5.
Mike has 600 ml of white paint and an unlimited quantity of red paint.
Find the largest quantity of pink paint that Mike can make.

.....

.....

.....

.....

.....

[3]

- (c) A train takes 3 hours 30 minutes to travel a distance of 168 miles.
Calculate the average speed of the train.

.....

.....

.....

.....

.....

.....

[3]

5. (a) Solve $7(x - 2) = 5(3 + x)$.

.....

.....

.....

.....

.....

.....

.....

[3]

(b) Solve $4 = \frac{28}{x}$.

.....

.....

.....

.....

[1]

(c) Factorise $x^2 - 5x + 6$.

.....

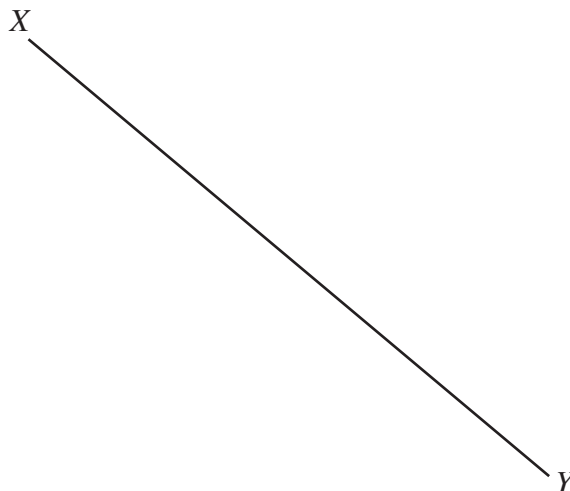
.....

[2]

6. Shade the region that satisfies both of the following conditions.

- (i) The points are less than 7 cm from X .
(ii) The points are nearer to Y than to X .

[3]



Turn over.

- (b) The volume of a cuboid is 240 cm^3 .
The height of the cuboid is 10 cm.
The length of the base is 5 cm longer than the width of the base.
Find the width of the base of the cuboid.

.....

.....

.....

.....

.....

.....

.....

.....

.....

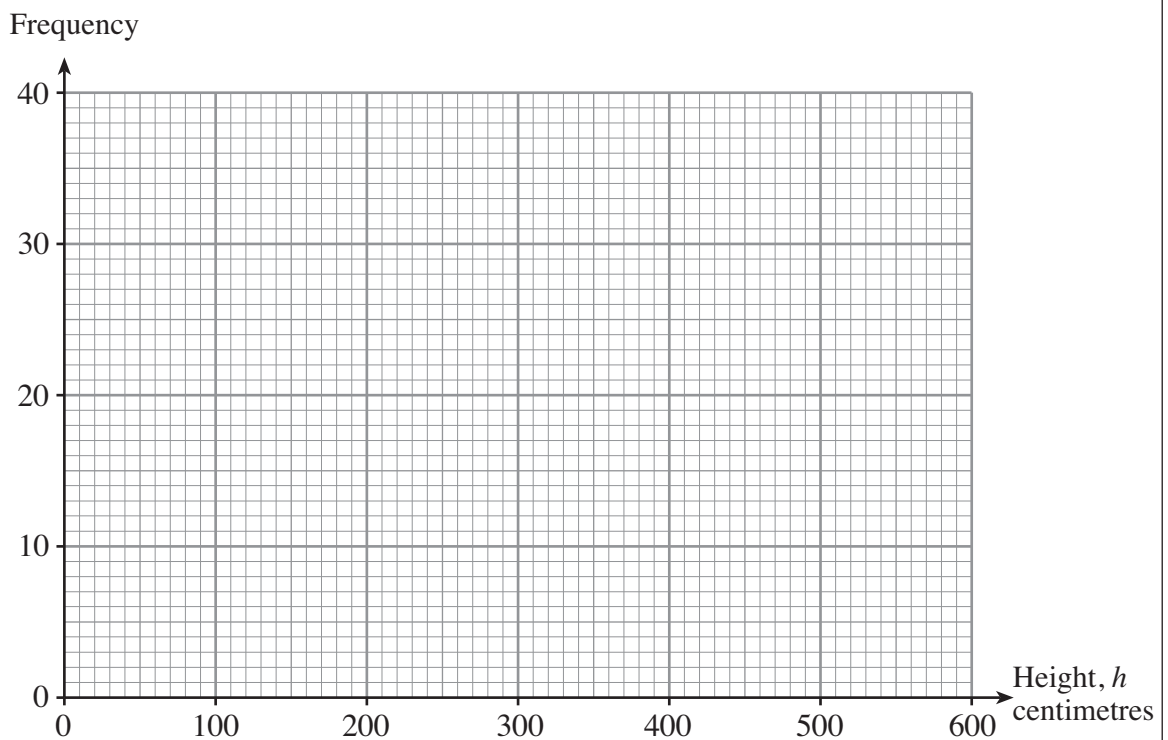
[3]

8. (a) The heights of 100 trees were measured.
The table below shows a grouped frequency distribution of the results.

Height, h centimetres	$100 < h \leq 200$	$200 < h \leq 300$	$300 < h \leq 400$	$400 < h \leq 500$	$500 < h \leq 600$
Frequency	6	20	34	30	10

On the graph paper below, draw a frequency polygon to show this data.

[2]



- (b) The heights of 80 people were measured to the nearest centimetre.
The table shows a grouped frequency distribution of these heights.

Height (h centimetres)	Number of people
$151 \leq h \leq 157$	18
$158 \leq h \leq 164$	37
$165 \leq h \leq 171$	25

Find an estimate for the mean height of these people.

.....

.....

.....

.....

.....

.....

.....

.....

.....

[4]

10. The diagram shows two similar triangles.

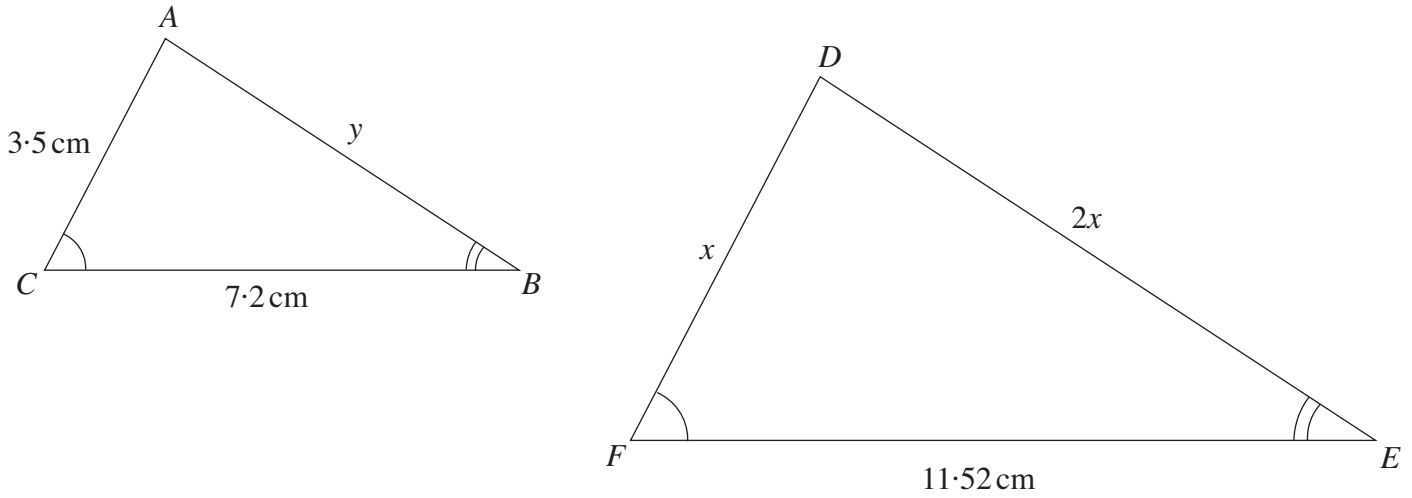


Diagram not drawn to scale.

Find the lengths of the sides marked x and y .

.....

.....

.....

.....

.....

.....

$x =$ $y =$

[3]

11. An intelligence test with a total possible score of 80 marks was given to 60 students. The following table shows a grouped frequency distribution of their results.

Score on the test	0 - 19	20 - 39	40 - 59	60 - 79
Number of students	5	10	35	10

Notice that no student scored full marks in the intelligence test.

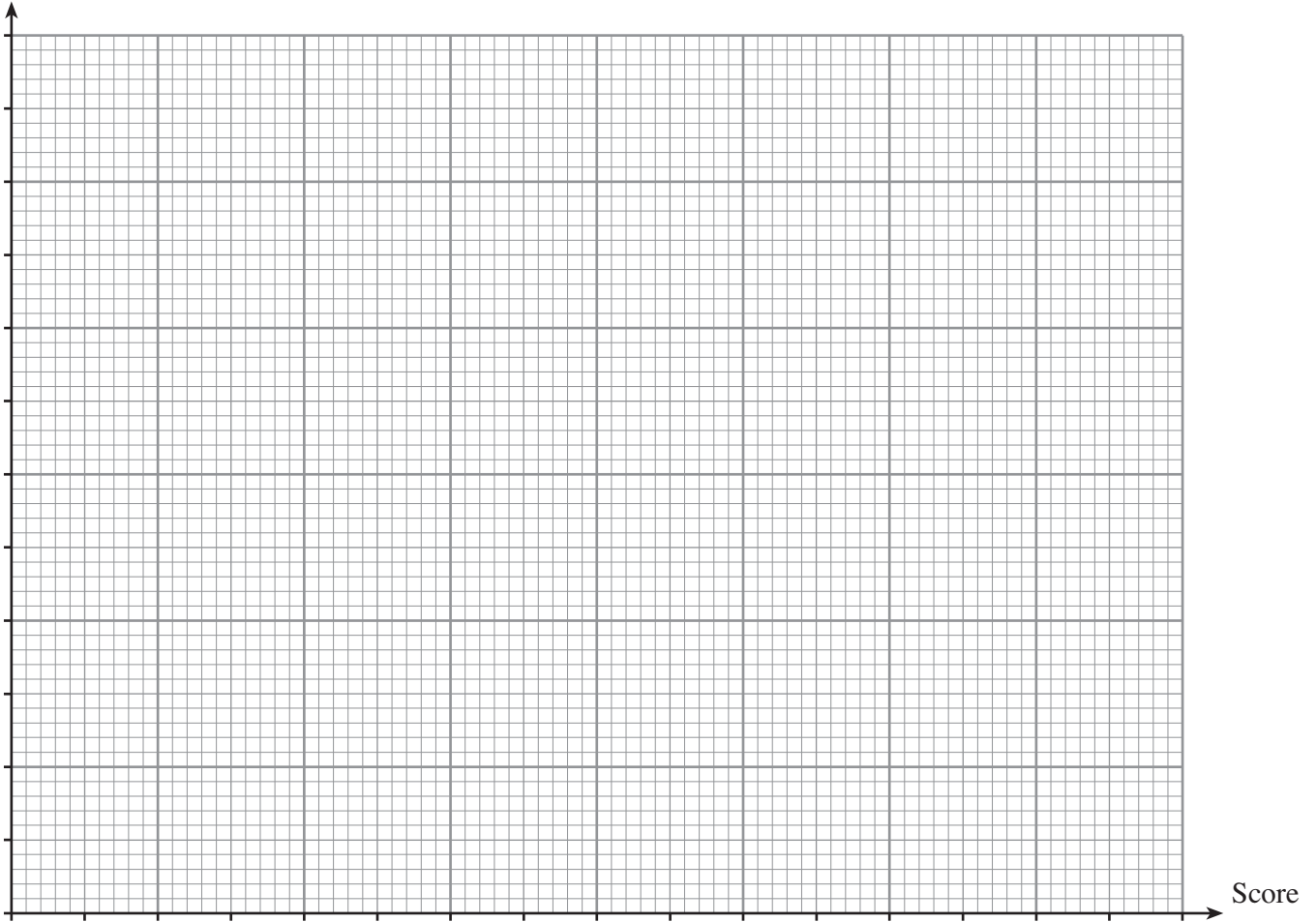
- (a) Complete the following cumulative frequency table.

Score on the test	< 20	< 40	< 60	< 80
Cumulative frequency	5			

[1]

(b) On the graph paper below, draw a cumulative frequency diagram to show this information. [4]

Cumulative
frequency



(c) Students passed the intelligence test if they scored 50 marks or more. Approximately how many students passed the intelligence test?

.....
.....

[2]

13. Given that y is inversely proportional to x , and that $y = 3$ when $x = 2$,

(a) find an expression for y in terms of x ,

.....

.....

.....

.....

[3]

(b) use the expression you found in (a) to complete the following table.

x	-1	2	
y		3	0.1

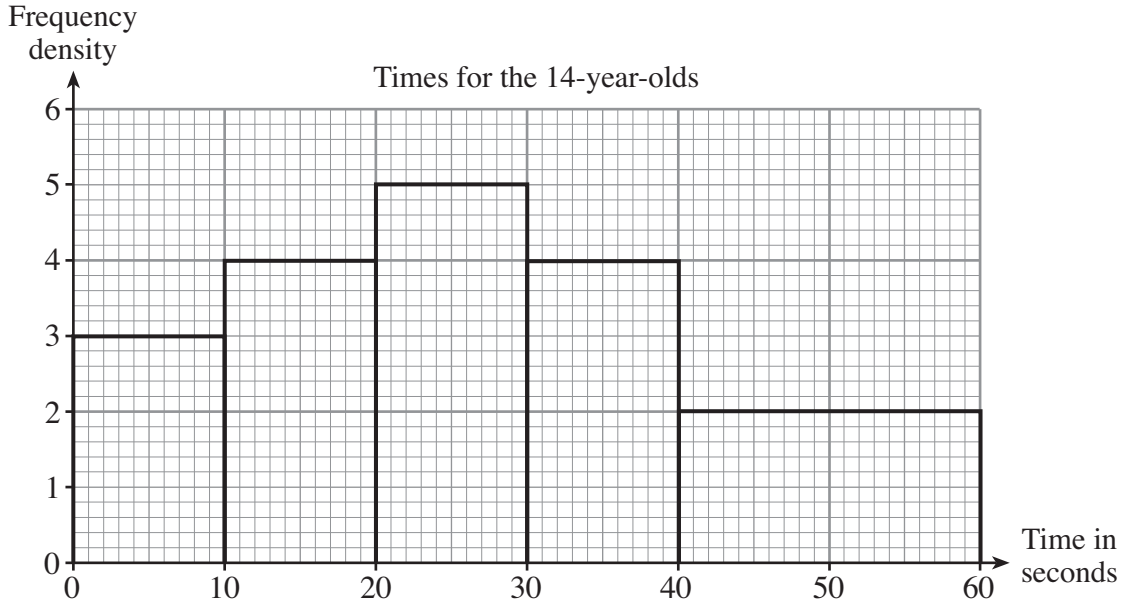
.....

.....

.....

[2]

14. As part of an investigation, the time taken to complete an obstacle course was measured for each pupil in a group of fourteen-year-olds. The results are summarised in the histogram below.



- (a) Use the histogram to calculate the number of fourteen-year-olds in this group.

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

[3]

- (b) The time taken to complete the same obstacle course was measured for each student in a group of 200 eighteen-year-olds.

The following grouped frequency distribution was obtained.

Time, t seconds	$0 < t \leq 10$	$10 < t \leq 20$	$20 < t \leq 30$	$30 < t \leq 40$	$40 < t \leq 60$
Number of students	10	20	30	40	100

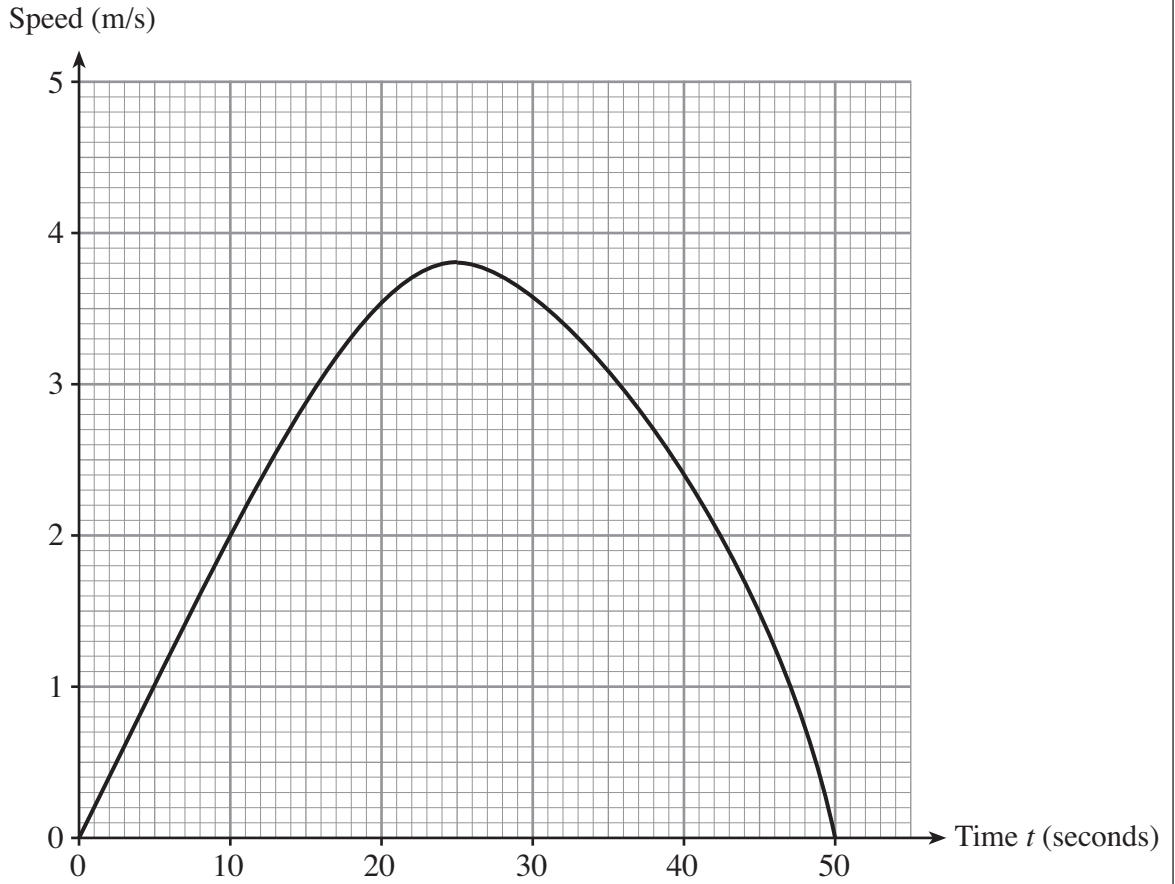
Find an estimate for the median of this distribution.

.....

.....

[1]

15. The graph below shows the speed of a train, in m/s, over a period of 50 seconds starting at time $t = 0$ seconds.



Estimate the acceleration of the train at time $t = 20$ seconds, stating clearly the units of your answer.

.....

.....

.....

.....

.....

[4]

MARK SCHEMES

MARK SCHEME

UNIT 1: MATHEMATICS IN EVERYDAY LIFE - FOUNDATION TIER

Question	Marks	Comments (Page 1)
1. (a) (i) 3025 (ii) Six hundred and five pounds (b) (i) 6541	B1 B2 B1 4	B1 for 'six hundred and five'. Ignore spelling.
2. (a) $450 - 348$ $= 102$ (b) $3804 \div 12$ $= 317$	M1 A1 M1 A1 4	C.A.O. C.A.O.
3. (a) (number of hours =) 4 (Cost =) $4 \times 6 + 9$ (£)33 (b) $30.55 - 3 \times 6$ $= (\text{£})12.55$	B1 M1 A1 M1 A1 5	Any indication that 6p.m. until 10p.m. is 4(hours) F.T. their time. Values substituted and 'taxi fare' made subject. C.A.O.
4. (a) Moscow (b) (i) $5(^{\circ}\text{C})$ (ii) $7(^{\circ}\text{C})$ (c) Paris (d) $2(^{\circ}\text{C})$ (e) $-5(^{\circ}\text{C})$	B1 B1 B1 B1 B1 6	-5 alone is B0. 9 or -9 alone is B0.
5. (a) $20 (\pm 2^{\circ})$ (b) $12(\text{cm}) (\pm 0.2\text{mm})$ $60(\text{cm})$	B1 B1 B1 3	F.T. their length $\times 5$. Unsupported answer of 60 ± 1 gains B2.
6. (a) 10 (b) (i) $\frac{1}{2}$ litre. (ii) 2 kg.	B1 B1 B1 3	C.A.O. Accept any indication of correct amount. Accept any indication of correct amount.

ASSESSMENT GRID**MATHEMATICS****UNIT 1: MATHEMATICS IN EVERYDAY LIFE****FOUNDATION TIER**

Question	Assessment Objectives (Marks)			Total Mark	QWC	Functional Elements
	AO1 (45% - 55%)	AO2 (25% - 35%)	AO3 (15% - 25%)			
1	4			4		✓ (a)
2		4		4		✓
3	5			5		✓
4	6			6		✓
5	3			3		
6	3			3		✓
7	5			5		✓
8			2	2		✓
9	2		2	4		✓
10		5		5		✓
11	3			3		✓
12		3		3		
13	1	4		5		
14		3		3		
15			10	10	✓	✓
Totals	32	19	14	65		50

MARK SCHEME

UNIT 1: MATHEMATICS IN EVERYDAY LIFE - HIGHER TIER

Question	Marks	Comments	(Page 1)
1. $\frac{15}{100} \times 460$ = (£) 69 (Selling price) (£) 391	M1 A1 A1 3	Alternate method	0.85 seen B1 0.85 × 460 M1 (£) 391 A1
2. 2142 267.75 295.2(0) 14.76 333.14 24.64	B1 B1 B1 B1 B1 B1 6	C.A.O. F.T. F.T. F.T. F.T.	
3. (a) (Volume) = $\pi \times 11^2 \times 26$ = 9883(cm ³) ≈ 10(litres) (b) $\frac{2 \times 100 \times 100 \times 100}{1000}$ = 2000	M1 A1 B1 M1 A1 5	Accept 9875 to 9890 inclusive. F.T. their volume ÷ 1000 to the nearest whole number. Or equivalent.	
4. 3500.00 <u>175.00</u> OR 3675.00 (Sight of 1.05 B1) <u>183.75</u> (3500 × 1.05 ³ M1) 3858.75 <u>192.94</u> or 192.93(75) (4051.69) or (4051.68(75)) (C.I.) = (£)551.69 or (£)551.68	B1 M1 A1 A1 4	B1 for an evaluation of a correct 5%. (525 implies 3 × 175 and so gains B1) For the overall method of finding three <u>different</u> 5%. C.A.O. for the amount or the three <u>correct</u> interests. F.T. <i>If 2 years used mark it as if it was the question asked, then MR-1.</i> <i>If 4 years used then final A1 is lost.</i> <i>Candidates using depreciation. Allow SC1 (as well as the B1) for seeing (£)499.19 or (£)499.18.</i>	

MARK SCHEME

UNIT 1: MATHEMATICS IN EVERYDAY LIFE - HIGHER TIER

Question	Marks	Comments (Page 3)
8. Setting up a model parallel to the 11 m side or 7 m side. $\text{Area of vinyl} = 11 \times 2 \times 4 (= 88)$ $\text{Cost} = 88 \times (\text{£})8.34$ $= (\text{£})733.92$ $\text{Cost} = 7 \times 3 \times 4 (= 84) \times (\text{£})8.34$ $= (\text{£})700.56$ Second method is cheaper (by (£)33.36)	B1 M1 M1 A1 M1 A1 A1 7	For clearly showing a model that covers the floor. Required calculation of the area of vinyl for their model. An 'area' \times (£)8.34 C.A.O. for their model. Required calculation for the cost of the other model. C.A.O. for their model. F.T. clear statement of which is the cheapest.
9. $\frac{18 \times 20}{16}$ $\times \frac{8}{12}$ $= 15 \text{ (days)}$	M1 M1 A1 3	Or equivalent e.g. $\times 1.25$ or $\div 0.8$. Or equivalent e.g. $\times 0.666\dots$ or $\div 1.5$. C.A.O.
10. 1.2×1 0.8×1.2 $= 0.96$ $96(\%)$	B1 B1 B1 B1 4	<i>If candidates assume an initial value, e.g. £500</i> For sight of 1.2 (£)600 B1 (£)480 B1 480/500 B1 96(%) B1
11. (Volume of 'big' cone) $= \frac{1}{3} \times \pi \times 45^2 \times 180$ $= 121500\pi \text{ (cm}^3\text{)}$ (Height of 'small' cone) = 120 (cm) (Volume of 'small' cone) $(= \frac{1}{3} \times \pi \times 30^2 \times 120)$ $= 36000\pi \text{ (cm}^3\text{)}$ (Volume of container) $= 121500\pi - 36000\pi$ $= 85500\pi \text{ (cm}^3\text{)}$ Volume of a hemisphere $= \frac{2}{3} \times \pi \times (\text{radius})^3$ $85500\pi = \frac{2}{3} \times \pi \times (\text{radius})^3$ $(\text{radius})^3 = 128250$ Radius = 50.4(296...)cm	M1 A1 B1 A1 M1 A1 M1 M1 A1 A1 10	For correct substitution(either cone) Accept $381500 \leq \text{volume} \leq 381900$ B1 F.T. 'their 120' Accept $113000 \leq \text{volume} \leq 113150$ M1 For correct strategy F.T. their volumes only if $\frac{1}{3} \pi r^2 h$ used. M1 F.T. 'their frustum volume' A1 A1

ASSESSMENT GRID

MATHEMATICS


UNIT 1: MATHEMATICS IN EVERYDAY LIFE

HIGHER TIER

	Assessment Objectives (Marks)			Total Mark	QWC	Functional Elements
	AO1 (45% - 55%)	AO2 (25% - 35%)	AO3 (15% - 25%)			
Question						
1	3			3		✓
2	6			6		✓
3	5			5		
4	4			4		✓
5			10	10	✓	✓
6	3	2		5	✓	
7	8			8		✓
8			7	7		✓
9		3		3		✓
10		4		4		✓
11		10		10	✓	
Totals	29	19	17	65		45

MARK SCHEME

UNIT 2: NON-CALCULATOR MATHEMATICS - FOUNDATION TIER

Question	Marks	Comments (Page 1)
1. (a) 7046 (b) 865 (c) 319 (d) (i) 7940 (ii) 7900 (e) 500 (f) 1, 2, 7, 14	B1 B1 B1 B1 B1 B1 B2 8	C.A.O. C.A.O. C.A.O. C.A.O. C.A.O. C.A.O. Allow 100. B1 for any 2 factors and no incorrect numbers.
2. (a) $20/5$ OR $20/4 \cdot 9(0)$ = 4 (b) $\frac{3}{4}$ (c) (i) $30\% = \cdot 3$ $\frac{1}{4} = \cdot 25$ (ii) $0 \cdot 2, \frac{1}{4}, 30\%$	M1 A1 B2 B1 B1 B1 7	Allow M1 for sight of $20/4 \cdot 9(0)$ OR $4 \cdot 90 + 4 \cdot 90 + 4 \cdot 90 + 4 \cdot 90 = 19 \cdot 60$ OR $20 - 4 \cdot 90 - 4 \cdot 90 - 4 \cdot 90 - 4 \cdot 90 = \cdot 40$ C.A.O. B1 for $\frac{6}{8}$ OR for the correct reduction of their incorrect $\frac{6}{8}$. C.A.O. C.A.O. Descending order gets B0
3. cylinder isosceles triangle pentagon parallelogram	B1 B1 B1 B1 4	C.A.O. C.A.O. C.A.O. C.A.O.
4. 	B1 B1 B1 3	The point A should be at 1 The point B should be at 0 or very close to it. The point C should be at $\frac{1}{6}$. (Allow between 0 and $\frac{1}{4}$ exclusive.)
5. $\begin{array}{r} 78 \\ \times 64 \\ \hline 312 \\ 4680 \\ \hline 4992 \end{array}$ = (£) 499.20	M1 A1 A1 3	Any correct method for the multiplication of 78(0) by 64 For either 312 or 4680 C.A.O. Place value errors get M0, A0
6. 2 rectangles of 3 by 8 2 rectangles of 3 by 3 Makes a net	B1 B1 B1 3	
7. (a) Subtract six (from the previous term) (b) Multiply (previous term) by four	B1 B1 2	C.A.O. C.A.O.

MARK SCHEME

UNIT 2: NON-CALCULATOR MATHEMATICS - FOUNDATION TIER

Question	Marks	Comments (Page 2)
8. $\angle DCB = 40$ $\angle DBC = 100$ $\angle DBA = 80$ $x = 20$	B1 B1 B1 B1 4	C.A.O. Finding the interior angle F.T. $180 - 2 \times$ 'their 40' F.T. 'their 100' F.T. $180 - 2 \times$ 'their 80'
9. (a) 16 (b) $10\% = 40 \quad 5\% =$ $(\pounds) 20$ (d) $19/2$ $= (\pounds) 9.50$	B1 M1 A1 M1 A1 5	C.A.O. For any correct method that would lead to 20 C.A.O. C.A.O.
10. (a) (i) $30 - y$ (ii) $a + 12$ (b) $3x = 6$ $x = \frac{6}{3}$ OR 2	B1 B1 B1 B1 4	Penalise extra ' $= x$ ' or ' $x =$ ' or ' $= n$ ' or ' $n =$ ' – 1 once only in this question. Change of letter is penalised –1 once only. C.A.O. Allow $6 + a + 6$ etc C.A.O. F.T. 'their 6' $\div 3$
11. 20 th shape centre at (40, ...) Pattern in y -coord: 5, 8, 11, ... is add 3 OR $\times 3$ OR $3n + 2$ 20 th shape centre at (..., 62) Grid from 40.5 by 62.5 to 42 by 64	B1 B1 B1 B1 4	F.T. their 20 th centre coordinates ± 1 or ± 2 .
12. Parallelogram with R, S and M meeting criteria.	B4 4	OR B3 M mid-point PR with quadrilateral, coordinates R, S, M . OR B2 Parallelogram, M not mid-point, coordinates R, S, M . OR B1 Coordinates R, S, M for their diagram.
13. $P(2, 2) = \frac{1}{6} \times \frac{1}{6}$ or 1 out of 36 $P(6, 6) = \frac{1}{6} \times \frac{1}{6}$ or 1 out of 36 $P(3, 4) = \frac{1}{6} \times \frac{1}{6} \times 2$ or 2 out of 36 \therefore (Probabilities are) not the same.	B1 B1 B1 E1 QWC2 6	or equivalent or equivalent or equivalent Award only if 1 st and 3 rd B1 awarded or if 2 nd and 3 rd B1 awarded QWC2 Presents material in a coherent and logical manner, using acceptable mathematical form, and with few if any errors in spelling, punctuation and grammar. QWC1 Evident weaknesses in organisation of material, and errors in use of mathematical form and in spelling, punctuation and grammar.

MARK SCHEME

UNIT 2: NON-CALCULATOR MATHEMATICS - FOUNDATION TIER

Question	Marks	Comments (Page 3)
14. (a) E e.g. "More throws" (b) (i) 40	B1 E1 B1 3	Accept 250
15. (a) 78 (b) Plots Curve (c) For the line $h = 60$ From their graph. (Theoretically 0.46 and 4.34)	B1 P1 C1 L1 B1 5	C.A.O. Penalise -1 on 2 nd error. Must be a curve through their points. Polygon gets C0. For both t values F.T. their graph and if at least 2 points of intersection.

ASSESSMENT GRID

MATHEMATICS

UNIT 2: NON-CALCULATOR MATHEMATICS

FOUNDATION TIER

Question	Assessment Objectives (Marks)			Total Mark	QWC	Functional Elements
	AO1 (45% - 55%)	AO2 (25% - 35%)	AO3 (15% - 25%)			
1	8			8		
2	7			7		✓ (a)
3	4			4		
4	3			3		
5	3			3		✓
6		3		3		
7	2			2		
8			4	4		
9	3	2		5		✓ (b) (c)
10	2	2		4		
11			4	4		
12			4	4		
13		6		6	✓	
14		3		3		
15		3	2	5		
Totals	32	19	14	65		9

MARK SCHEME

UNIT 2: NON-CALCULATOR MATHEMATICS - HIGHER TIER

Question	Marks	Comments (Page 1)
1. (a) $x = 72^\circ$ $y = 46^\circ$ $z = 46^\circ$ (b) $9z = 180$ OR $8z + z = 180$ $(z =) 20^\circ$	B1 B1 B1 M1 A1 5	F.T. their $y = z$. Accept indication of two angles shown = 180° . Accept correct answers without working for M1 A1.
2. (a) Correct translation. (b) Correct reflection. (c) Correct rotation.	B1 B2 B2 5	B1 Reflect in any horizontal line, OR $y = 5$ seen. B1 about (1, 2) but anticlockwise, or about (2, 1) clockwise, or almost correct.
3. (a) Suitable rounded or truncated values which lead to a calculation possible without calculator. Approximately 150. (b) r^9 (c) $t(t + 7 + 8w)$	M1 A1 B1 B1 4	e.g. 60, 300 and 120 OR 60, 300 and 100 OR ... F.T. their suitable values.
4. $P(2, 2) = \frac{1}{6} \times \frac{1}{6}$ or 1 out of 36 $P(6, 6) = \frac{1}{6} \times \frac{1}{6}$ or 1 out of 36 $P(3, 4) = \frac{1}{6} \times \frac{1}{6} \times 2$ or 2 out of 36 \therefore (Probabilities are) not the same.	B1 B1 B1 E1 QWC2 6	or equivalent or equivalent or equivalent Award only if 1 st and 3 rd B1 awarded or if 2 nd and 3 rd B1 awarded QWC2 Presents material in a coherent and logical manner, using acceptable mathematical form, and with few if any errors in spelling, punctuation and grammar. QWC1 Evident weaknesses in organisation of material, and errors in use of mathematical form and in spelling, punctuation and grammar.
5. Parallelogram with R , S and M meeting criteria.	B4 4	OR B3 M mid-point PR with quadrilateral, coordinates R , S , M . OR B2 Parallelogram, M not mid-point, coordinates R , S , M . OR B1 Coordinates R , S , M for their diagram.
6. (a) Plots Curve (b) For the line $h = 60$. From their graph. (Theoretically 0.46 and 4.34) (c) Value of t for $h = 0$ (Theoretical is $t = 6.37$) The stone hits the sea (and is no longer in the air).	P1 C1 L1 B1 B1 E1 6	Penalise -1 on 2 nd error. Must be a curve through their points. Polygon gets C0. For both t values. F.T. their graph and if at least 2 points of intersection. Along these lines.

MARK SCHEME

UNIT 2: NON-CALCULATOR MATHEMATICS - HIGHER TIER

Question	Marks	Comments (Page 2)
7. Shaded: $n^2 + 1$ OR $(n + 2)^2 - (4n + 3)$ White: $4n + 3$ OR $(n + 2)^2 - (n^2 + 1)$	B2 B3 5	B1 $n^2 + \dots$ OR $(n + 2)^2 - (4n + 3)$ with missing brackets. B2 for $4n + \dots$ OR $(n + 2)^2 - (n^2 + 1)$ with missing brackets. B1 for 7, 11, 15, 19 with attempt to find n th term.
8. (a) E Explanation. e.g. "More throws" (b) 0.6×0.7 $= 0.42$	B1 E1 M1 A1 4	Accept 250.
9. (a) 3.45×10^5 (b) 7.82×10^{-5}	B1 B1 2	
10. $3d + 2c = 127$ and $4d + 3c = 174$ Equate coefficients, allow 1 slip OR alternative. Weight of dog or cat correct, $d = 33$ or $c = 14$ Method to find second weight. Other correct weight. $3 \text{ dogs} + 1 \text{ cat} = 113 \text{ (kg)}$	M1 M1 A1 M1 A1 B1 6	Alternatively: 1 dog + 1 cat = 47 (kg) 2 dogs + 2 cats = 94 (kg) 1 dog weighs $(127 - 94) = 33$ (kg) 1 cat weighs $(47 - 33) = 14$ (kg) 113 (kg) <i>Or other alternative strategy, e.g. trial & improvement.</i>
11. (a) 25° Angle in same segment, angles in triangle. (b) 68° AND Alternate segment theorem.	B1 E1 B2 4	Appropriate description for E mark. Not calculation. B1 for 68°
12. (a) Sketch with steeper gradient within the given curve. Correct sketch through $(0, -2)$. (b) Reflection (in x -axis). Correct reflection and $(0, -4)$ indicated.	B1 B1 B1 B1 4	Allow for reflection in any horizontal line.
13.. (a) $3e(g + 4) = 2(7 - g)$ (OR $3eg + 12e = 14 - 2g$) $3eg + 2g = 14 - 12e$ $g(3e + 2) = 14 - 12e$ $g = \frac{14 - 12e}{3e + 2}$ or equivalent. (b) $\sqrt{32} = \sqrt{2 \times 16}$ or $4\sqrt{2}$ $(\sqrt{32} - \sqrt{2})^2 = (4\sqrt{2} - \sqrt{2})^2 = (3\sqrt{2})^2$ $= 18$	B1 B1 B1 B1 M1 M1 A1 7	Intention allowed (e.g. without brackets). Expanding brackets, and collecting terms left and right. Factorising for g . Do not award for $-g = \dots$ Allow F.T. B marks for processes of equivalent level of difficulty until 2nd error. Penalise -1 further working only if B4 awarded. OR M2 for $32 - 2\sqrt{2}\sqrt{32} + 2$, or M1 for 2 of the 3 terms correct.
14. $1 - P(\text{no cherry})$ $P(\text{no cherry}) = \frac{6}{12} \times \frac{5}{11} \times \frac{4}{10} \left(= \frac{12}{1320} = \frac{1}{11} \right)$ $\frac{1200}{1320} \left(= \frac{120}{132} = \frac{10}{11} \right)$	B1 M1 A1 3	Or equivalent complete strategy, idea. Seen alone not part of further probabilities. OR full alternative with correct values. CAO.

ASSESSMENT GRID

MATHEMATICS

UNIT 2: NON-CALCULATOR MATHEMATICS

HIGHER TIER

	Assessment Objectives (Marks)			Total Mark	QWC	Functional Elements
	AO1 (45% - 55%)	AO2 (25% - 35%)	AO3 (15% - 25%)			
Question						
1	3	2		5		
2	5			5		
3	4			4		
4		6		6	✓	
5			4	4		
6		6		6		
7		5		5		
8	2	2		4		
9	2			2		
10			6	6		
11	4			4		
12	4			4		
13	7			7		
14			3	3		
Totals	31	21	13	65		0

MARK SCHEME

UNIT 3: CALCULATOR-ALLOWED MATHEMATICS - FOUNDATION TIER

Question	Marks	Comments (Page 1)
1. Attempting to count squares 69 – 76 (Area =) 690 – 760 (m ²)	M1 A1 B1 3	Within the range inclusive F.T. their number of squares × 10
2. (a) (3.40) 2.01 7.96 9.24 22.61 (b) 10 – 3.88 – 5.29 = (£)(0).83 OR 83(p) OR £.83p (c) $\frac{3}{5}$ or equivalent $\frac{3}{4}$ or equivalent (d) (i) 36 (ii) 74	B1 B1 B1 B1 M1 A1 B1 B1 B1 B1 B1 10	C.A.O. C.A.O. C.A.O. F.T. their figures for one error 22 61 is B0, but 22–61 OR 22,61 is B1 £83 OR .83p is A0 C.A.O. C.A.O.
3. (a) 11 9 8 12 (b) G(reen) (c) B, R, Y, G along one axis Uniform scale Four bars at correct heights	B2 B1 B1 M1 A2 7	B1 for any two/three correct tallies and frequencies F.T. their table of frequencies F.T. their table of frequencies A1 for any 2 correct bars on F.T.
4. Kim < Jane Shaun < Kim Shaun < Kim < Jane Shaun < Kim < Jane < Rachel	B1 B1 B1 B1 4	Ordering Kim and Jane Ordering Shaun and Kim Ordering Shaun and Kim and Jane Ordering all four
5. (a) 17 (b) 9	B1 B2 3	C.A.O. B1 for –6
6. (a) 1.5 (b) 2.7	B2 B2 4	B1 for 1.511..... B1 for 2.679.....

MARK SCHEME

UNIT 3: CALCULATOR-ALLOWED MATHEMATICS - FOUNDATION TIER

Question	Marks	Comments (Page 2)
7. (a) Missing length = 6 (cm) $9+3+6+6+3+9$ $= 36$ (cm) (b) Area of one rectangle = 27 Area of shape = $2 \times 27 - 3 \times 3$ OR $9 \times 3 + 6 \times 3$ $= 45$ cm^2	B1 M1 A1 B1 M1 A1 U1 7	C.A.O. For adding up 2 lots of 3 and 9 to 2 lots of 'their 6' F.T. $24 + 2 \times$ 'their 6' C.A.O. F.T. 'their 27' C.A.O. independent of all other marks.
8. (a) Sum of the numbers (427) Sum/7 61 (b) 35 54 54 (60) 66 72 86 median = 60	M1 m1 A1 M1 A1 5	For attempt to add the numbers. Unsupported $360 - 515$ gets M1 Dependent on the M C.A.O. For putting the numbers in order C.A.O.
9. Finding A: $A = 2$ Finding B: $2B + 5 = B + 11$ $B = 6$ Finding C: $C + 3 = A + B + 5$ $C + 3 = 13$ $C = 10$	B1 B1 B1 B1 B1 B1 6	C.A.O. C.A.O. F.T. their equation for B if of the form $aB + b = cB + d$ C.A.O. F.T. 'their A and B'
10. 3 or 4 angles correct and correctly labelled. 3 or 4 angles correct, labels not fully correct. 2 angles correct and correctly labelled. 2 angles correct, labels not fully correct. 1 angle correct and correctly labelled. OR <u>If 0 OR 1 for their diagram or no diagram.</u> $360/180$ Angles are 70, 60, 120 and 110	B4 B3 B3 B2 B1 (M1) (A1) 4	Use the overlay and allow $\pm 2^\circ$. Correct labels (NOT the frequency OR angle) 3 correct labels are enough. If B0 scored for the diagram, check the angles and the method to see if the M1 and the A1 can be awarded. 1 is 2° gets the M1 C.A.O. OR SC1 for all correct percentages: $19(\cdot 4)\%$, $16(\cdot 7)\%$, $33(\cdot 3)\%$, $30(\cdot 6)\%$

MARK SCHEME

UNIT 3: CALCULATOR-ALLOWED MATHEMATICS - FOUNDATION TIER

Question	Marks	Comments (Page 3)
11. $(£)8.43 - 2.5 \times (£)1.58$ $= (£)4.48$ $4.48/3.5$ $= (£)1.28$	M1 A1 M1 A1 4	For the complete method that leads to cost of the pears. C.A.O. F.T. 'their 4.48. 8.43/3.5 gets M0, A0 Reversal of pears and apples is MR-1. (£2.90 and £1.16)
12. $6 + 3x = 11 + 15 - 5x$ $8x = 20$ $x = \frac{20}{8}$ $x = 2\frac{1}{2}$ or $x = 2.5$	B2 B1 B1 4	B1 for $6 + 3x$, B1 for $15 - 5x$ <i>Stop at 2nd error</i>
13. $80/5$ 16 and 64	M1 A1 2	Intention to divide 80 by 5. CAO
14. Statements <i>explaining</i> why claims are or are not valid, e.g. Fiona was stationary between 12:20 and 12:30 Distance from home at 13:00 is zero Line is steeper between 12:35 and 13:00 Statement regarding truth of all claims, e.g. Claim 2 true, claims 1 and 3 false	B1 B1 B1 B1 QWC2 6	or Fiona was same distance from home between 12:20 and 12:30 C.A.O. QWC2 Presents material in a coherent and logical manner, using acceptable mathematical form, and with few if any errors in spelling, punctuation and grammar. QWC1 Evident weaknesses in organisation of material, and errors in use of mathematical form and in spelling, punctuation and grammar.
15. Perpendicular bisector of AB Bisector of angle C Arc of a circle centre C , radius 6cm Region shaded	B1 B1 B1 B1 4	Mark for the correct intention but within $\pm 2\text{mm}$. Mark for the correct intention but within $\pm 2\text{mm}$. Mark for the correct intention but within $\pm 2\text{mm}$. F.T. if possible. Region must be of 'similar' shape (bounded by 2 lines and an arc of a circle).
16. (a) Area rectangle $6.5 \times 4.6 (= 29.9 \text{ cm}^2)$ Use of $\frac{1}{2} \pi r^2$ Radius of 2.3 (cm) used $38.2(\dots \text{ cm}^2)$ (b) $\dots \times \dots \times 10 = 240$ length \times width = 24 width = 3 (cm)	B1 B1 B1 B1 M1 A1 A1 7	Or alternative strategy for first step.

ASSESSMENT GRID

MATHEMATICS

UNIT 3: CALCULATOR-ALLOWED MATHEMATICS

FOUNDATION TIER

Question	Assessment Objectives (Marks)			Total Mark	QWC	Functional Elements
	AO1 (45% - 55%)	AO2 (25% - 35%)	AO3 (15% - 25%)			
1	3			3		
2	10			10		✓ (a)(b)
3	3	4		7		
4			4	4		
5	3			3		
6		4		4		
7		7		7		
8	5			5		
9			6	6		
10	4			4		
11		4		4		
12	4			4		
13	2			2		✓
14		6		6	✓	
15	4			4		
16	4		3	7		
Totals	42	25	13	80		8

MARK SCHEME

UNIT 3: CALCULATOR-ALLOWED MATHEMATICS - HIGHER TIER

Question	Marks	Comments (Page 1)
1. (a) 8 (b) $\frac{1}{4}$ or 0.25	B2 B2 B1 3	B1 for sight of 20 or (+)4 as part of the numerator. Allow B1 for sight of -8 or an answer of 40.
2. (a) All points plotted correctly. (b) Positive (correlation). (c) Line of best fit with points above and below. (d) Reasonable estimate for the number of visitors.	B2 B1 B1 B1 5	B1 for at least 3 correct plots. Ignore line of best fit, <i>penalise joined point to point -1</i> .
3. (a) $80 / 5$ 16 and 64 (b) $(600 / 5 =) 120$ Either 7×120 OR 2×120 seen 840 (ml) (c) $168 / \text{time}$ $168 / 3.5$ = 48 (mph)	M1 A1 M1 M1 A1 B1 M1 A1 8	Intention to divide 80 by 5. C.A.O. M0 for 35% of 340 without operator. Accept $168 / 3.3$ for B1 only $168 / 210$ Accept 0.8 miles per minute for M1 A1 only if units given, otherwise 0.8 gets B1 M1 A0.
4. Statements explaining why claims are or are not valid, e.g. Fiona was stationary between 12:20 and 12:30 Distance from home at 13:00 is zero Line is steeper between 12:35 and 13:00 Statement regarding truth of all claims, e.g. Claim 2 true, claims 1 and 3 false	B1 B1 B1 B1 QWC2 6	or Fiona was same distance from home between 12:20 and 12:30 C.A.O. QWC2 Presents material in a coherent and logical manner, using acceptable mathematical form, and with few if any errors in spelling, punctuation and grammar. QWC1 Evident weaknesses in organisation of material, and errors in use of mathematical form and in spelling, punctuation and grammar.
5. (a) $7x - 14 = 15 + 5x$ $2x = 29$ $x = 14\frac{1}{2}$ OR 14.5 OR $\frac{29}{2}$ (b) $x = 7$ OR $\frac{28}{4}$ (c) $(x - 3)(x - 2)$	B1 B1 B1 B1 B2 6	F.T. until 2 nd error. F.T. until 2 nd error. B1 for $(x \dots 3)(x \dots 2)$
6. Correct region shaded .	B3 3	Mark intention. B1 for line, B1 for arc, B1 for shading (F.T. from 2 arcs or 2 lines). Shading needs to be on both sides of the given line.

MARK SCHEME

UNIT 3: CALCULATOR-ALLOWED MATHEMATICS - HIGHER TIER

Question	Marks	Comments (Page 2)								
7. (a) Area rectangle $6.5 \times 4.6 (= 29.9 \text{ cm}^2)$ Use of $\frac{1}{2} \pi r^2$ Radius of 2.3 (cm) used $38.2(\dots \text{ cm}^2)$ (b) $\dots \times \dots \times 10 = 240$ length \times width = 24 width = 3 (cm)	B1 B1 B1 B1 M1 A1 A1 7	Or alternative strategy for first step.								
8. (a) Correct frequency polygon. (b) Mid points 154, 161, 168 $154 \times 18 + 161 \times 37 + 168 \times 25$ $(\sum fx =) 12929$ $161.6(125)$	B2 B1 M1 A1 A1 6	IGNORE bars if polygon drawn. B1 for 4 correct plots, or correct vertical plots, or correct horizontal plots. SC1 for correct frequency diagram or SC1 for translated polygon. F.T. for their mid points from within group (not bounds). F.T. for correct sum of their fx terms. F.T. their $\sum fx / 80$ correct evaluated. Do not allow 161. <i>Unsupported 161.6125 awarded all 4 marks.</i> SC1 for bounds with correct F.T. answer (lower 158.6125, upper 164.6125).								
9. One correct evaluation $4 \leq x \leq 5$ 2 correct evaluations, $4.3 \leq x \leq 4.4$, one either side of 0. 2 correct evaluations, $4.3 \leq x \leq 4.35$, one either side of 0. OR evaluation of 4.35 given previous B1. <i>No calculations: accept "too high", ">", etc.</i>	B1 B1 M1 A1 4	<table border="1"> <tr> <td>x</td> <td>$5x^3 - 82x - 45$</td> </tr> <tr> <td>4</td> <td>- 53</td> </tr> <tr> <td>5</td> <td>170</td> </tr> </table>	x	$5x^3 - 82x - 45$	4	- 53	5	170	4.1 4.2 4.3 4.4 4.5 4.6 4.7 4.8 4.9	- 36.595 - 18.96 - 0.065 20.12 41.625 64.48 88.715 114.36 141.445
x	$5x^3 - 82x - 45$									
4	- 53									
5	170									
10. Correct method with values shown to find x . $(11.52 / 7.2) \times 3.5$ OR $x / 11.52 = 3.5 / 7.2$ $x = 5.6$ (cm) $y = 7$ (cm)	M1 A1 B1 3	Or equivalent, e.g. 1.6×3.5 . Scale factor 1.6 insufficient for M marks. x may be found after y . C.A.O. F.T. $x / 0.8$ (or $x \times 1.25$) correctly evaluated. $y = 7$ from 2×3.5 is B1.								
11. (a) 15, 50, 60 (b) Correct suitable scales on both axes. Idea, plotting upper class boundary (consistent) with the corresponding cumulative frequency. 2 points plotted correctly. All points correct and joined by straight lines or curve. (c) Indication of reading off their graph when score is 50 (≈ 32 or 33 students) Number passed $\approx 60 - 33$ ≈ 27	B1 B1 M1 A1 A1 M1 A1 7	In (b) accept plots at 20,40,60,80 OR 19.5,39.5,59.5,79.5 FT their cumulative table of values for all marks, must be cumulative. SC1 if plotted and joined using mid-points or -1. Or alternative, e.g. halving number of students in class 40 - 59 (17 or 18 students) Number passed $\approx 17 + 10$ ≈ 27								

MARK SCHEME

UNIT 3: CALCULATOR-ALLOWED MATHEMATICS - HIGHER TIER

Question	Marks	Comments (Page 3)								
12. $AE = 7.2 \times \tan 55^\circ$ $AE = 10.282666$ Use of $AD = \text{their } AE - 1.3$ $\sin C = AD / 12.8$ $44.(\text{569.....})^\circ$	M2 A1 B1 M1 A1 6	M1 for $\tan 55^\circ = AE / 7.2$ Accept rounded or truncated. F.T. their AD . Must be $< 10.282\dots$ or $< \text{“their } AE\text{”}$ and not 1.3. C.A.O. 42.8° from 10 cm, 44.7° from 10.3cm.								
13. (a) $y \propto \frac{1}{x}$ OR $y = \frac{k}{x}$ $3 = \frac{k}{2}$ $y = \frac{6}{x}$ (b) <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td>x</td><td>-1</td><td>2</td><td>60</td></tr><tr><td>y</td><td>-6</td><td>3</td><td>0.1</td></tr></table>	x	-1	2	60	y	-6	3	0.1	B1 M1 A1 B2 5	F.T. non linear only. May be implied in part (b). F.T. their non linear expression. B1 for each value. Do not accept $\frac{6}{-1}$ for -6.
x	-1	2	60							
y	-6	3	0.1							
14. (a) $(30 + 40 + 50 + 40 + 40 =) 200$ (b) 40 (seconds)	B3 B1 4	Allow B1 for one correct area, or B2 for any three correct. C.A.O. $200 / 5 = 40$ gets B0.								
15. Tangent at $t = 20$ Gradient = change y / change x FT reasonable tangent ≈ 0.1 m/s^2 or ms^{-2}	B1 M1 A1 U1 4	Independent of all other marks								
16. Overall strategy, e.g. Pythagoras' Theorem and method for solution. $x^2 + (x + 2.1)^2 = 12.32$ OR equivalent logic $2x^2 + 4.2x - 146.88 = 0$ $x = \frac{-4.2 \pm \sqrt{4.2^2 - 4 \times 2 \times (-146.88)}}{4}$ $= \frac{-4.2 \pm \sqrt{1192.68}}{4}$ $7.583799\dots$ (and $-9.683799\dots$) PQ = 7.6 (cm) and QR = 9.7 (cm)	S1 M1 A1 M1 A1 A1 B1 7	Or alternative method. Use of correct expressions or equation with acceptable method. Allow one error. Context does not require negative solution. F.T. their PQ and PQ + 2.1 to 1 dp provided M1 awarded Trial & improve accepted, needs confirmation 2 dp check								
17. Overall strategy, e.g. cosine rule & $\frac{1}{2} ab \sin C$ $BD^2 = 8.7^2 + 12.1^2 - 2 \times 8.7 \times 12.1 \times \cos 80$ ($BD^2 = 185.54\dots$) $BD = 13.62\dots(\text{cm})$ Area CDB = $\frac{1}{2} 6.3 \times BD \times \sin 25$ (= 18.133... cm ²) Area ADB = $\frac{1}{2} 8.7 \times 12.1 \times \sin 80$ (= 51.835...cm ²) Area quad. = 33.7(... cm ²)	S1 M1 A1 M1 M1 A1 6	F.T. their BD^2 if M1 awarded. F.T. their BD . F.T. if one of M marks awarded, and their calculations accurate. - 1 for poorly expressed mathematics (QWC).								

ASSESSMENT GRID

MATHEMATICS

UNIT 3: CALCULATOR-ALLOWED MATHEMATICS

HIGHER TIER

Question	Assessment Objectives (Marks)			Total Mark	QWC	Functional Elements
	AO1 (45% - 55%)	AO2 (25% - 35%)	AO3 (15% - 25%)			
1	3			3		
2	5			5		✓
3	5	3		8		✓
4		6		6	✓	
5	6			6		
6	3			3		
7	4		3	7		
8	6			6		
9	4			4		
10	3			3		
11	1	6		7		
12		6		6		
13	5			5		
14	4			4		
15		4		4		
16			7	7		
17			6	6		
Totals	49	25	16	90		13

SUMMARY ASSESSMENT GRIDS

SUMMARY ASSESSMENT GRIDS**MATHEMATICS****FOUNDATION TIER**

Assessment Objectives							Total Marks
AO1 (45% - 55%)		AO2 (25% - 35%)		AO3 (15% - 25%)			
Unit	Mark	%	Mark	%	Mark	%	
1	32	49%	19	29%	14	22%	65
2	32	49%	19	29%	14	22%	65
3	42	53%	25	31%	13	16%	80
Totals	106	50%	63	30%	41	20%	210

HIGHER TIER

Assessment Objectives							Total Marks
AO1 (45% - 55%)		AO2 (25% - 35%)		AO3 (15% - 25%)			
Unit	Mark	%	Mark	%	Mark	%	
1	29	45%	19	29%	17	26%	65
2	31	48%	21	32%	13	20%	65
3	49	54%	25	28%	16	18%	90
Totals	109	50%	65	29%	46	21%	220

N.B. An Assessment Grid for each Unit, at each tier, appears as the last page of the relevant mark scheme.