



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

GCSE MATHEMATICS – LINEAR

SPECIMEN ASSESSMENT MATERIALS

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QUESTION PAPERS

Candidate Name	Centre Number	Candidate Number
		0



GCSE

MATHEMATICS - LINEAR

SPECIMEN PAPER

FOUNDATION TIER

PAPER 1 (Non-calculator)

$1\frac{3}{4}$ 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 3.14.

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.

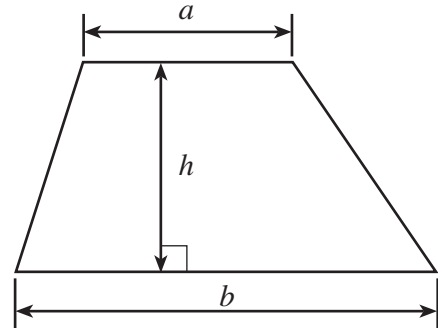
The number of marks is given in brackets at the end of each question or part-question.

You are reminded that assessment will take into account the quality of written communication (including mathematical communication) used in your answer to question **17(b)**.

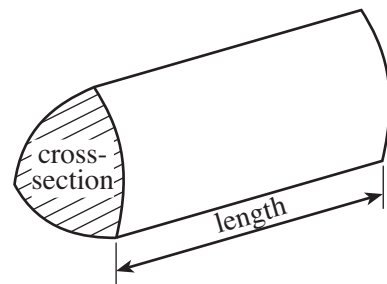
For Examiner's use only		
Question	Maximum Mark	Mark Awarded
1	10	
2	3	
3	5	
4	8	
5	5	
6	9	
7	4	
8	6	
9	8	
10	4	
11	8	
12	5	
13	5	
14	4	
15	5	
16	3	
17	8	
TOTAL MARK		

Formula List

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



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



1. (a) (i) Write down, in figures, the number twenty four thousand five hundred and seven.

..... [1]

- (ii) Write down, in words, the number 6014.

..... [1]

- (b) Using the following list of numbers

22 81 24 35 78 59 3 61 69

write down

- (i) two numbers that have a sum of 100,

..... [1]

- (ii) the number that must be added to 36 to make 95,

..... [1]

- (iii) a multiple of 7,

..... [1]

- (iv) the square of 9.

..... [1]

- (c) Write down all the factors of 55.

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

- (d) How many torches at £3.85 each can be bought with £20?

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

2. Which **metric unit** is **best used** to measure

the volume of water in a bucket,

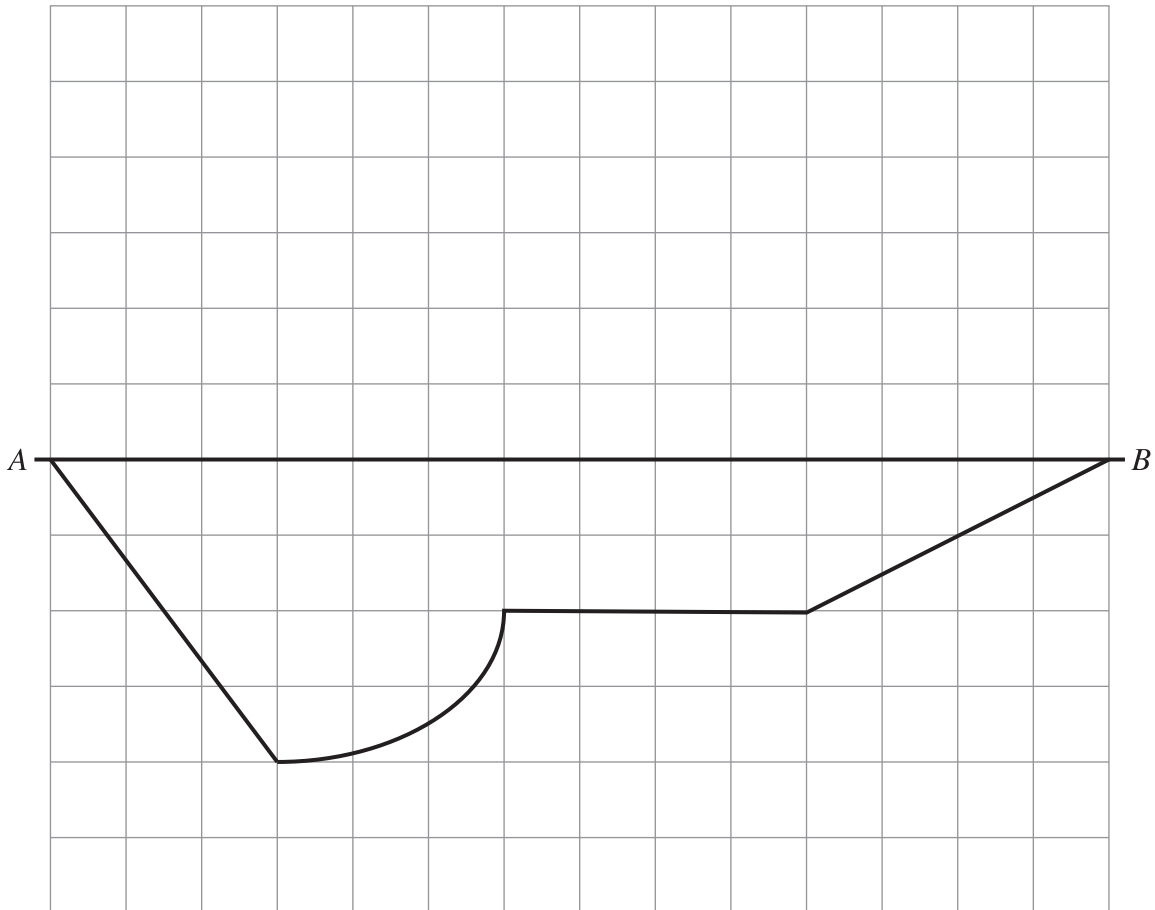
the area of the floor of a classroom,

the distance from Llandudno to Swansea,

[3]

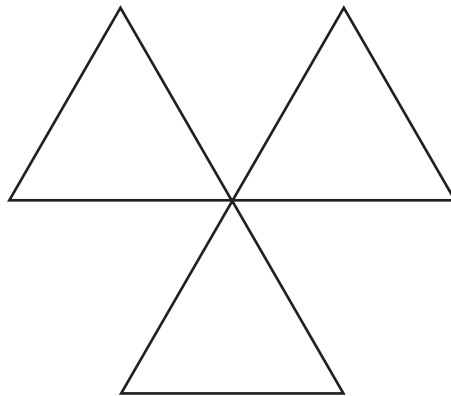
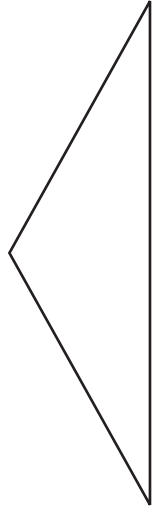
3. (a) Complete the following shape so that it is symmetrical about the line AB .

[2]

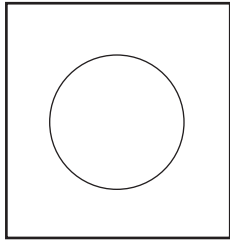


(b) Draw all the lines of symmetry on each of the following diagrams.

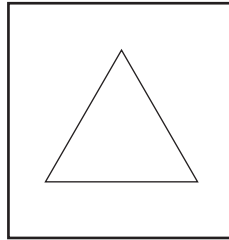
[3]



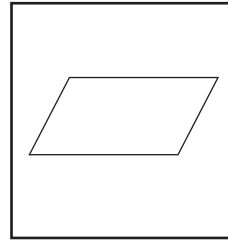
4. A bag contains a large number of cards. Drawn on each card there is either a circle, a triangle, a parallelogram or a hexagon.



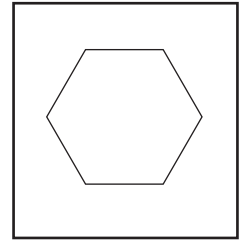
Circle (C)



Triangle (T)



Parallelogram (P)



Hexagon (H)

Thirty two pupils were asked to select a card at random, note down the shape and replace the card in the bag.

Here are the results.

C	P	H	T	P	H	T	P
P	H	T	P	C	H	P	H
T	C	H	P	T	P	H	C
H	P	T	H	P	C	T	P

- (a) Using the centimetre squared grid on the opposite page, draw a bar chart of the data given.

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[6]

- (b) One of the pupils is selected at random and asked to show their card. What is the probability that the card has a triangle drawn on it?

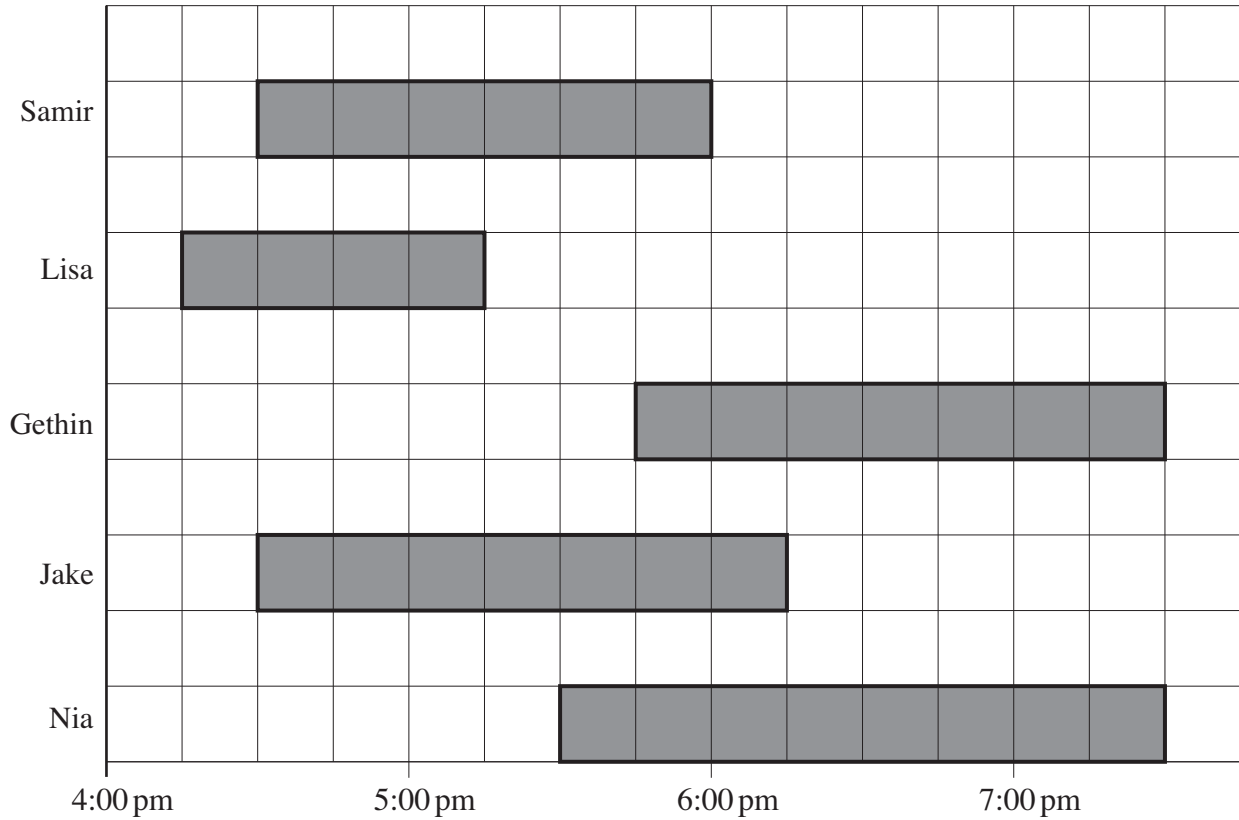
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[2]

5. The chart shows the times five friends spent at a gym.



(a) Who was the first person to arrive at the gym?

..... [1]

(b) For how long was Jake at the gym?

..... [2]

(c) State the times when at least 3 of the friends were in the gym together.

..... [2]

6. (a) Write down the next term in **each** of the following sequences.

(i) 2, 10, 18, 26,

(ii) 100, 84, 68, 52,

.....
[2]

(b) Susan thinks of a number.
She multiplies her number by 5 and subtracts 6.
Her answer is 34.
What was her number?

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[2]

(c) Simplify $6g + 2g + g$.

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[1]

(d) Find the value of $3c + 4d$, when $c = 4$ and $d = 2$.

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[2]

(e) There is a relation between the x -coordinate and the y -coordinate of each of the following points.

(1, 4) (2, 5) (3, 6) (4, 7) (x, y)

Write down the formula connecting x and y .

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[2]

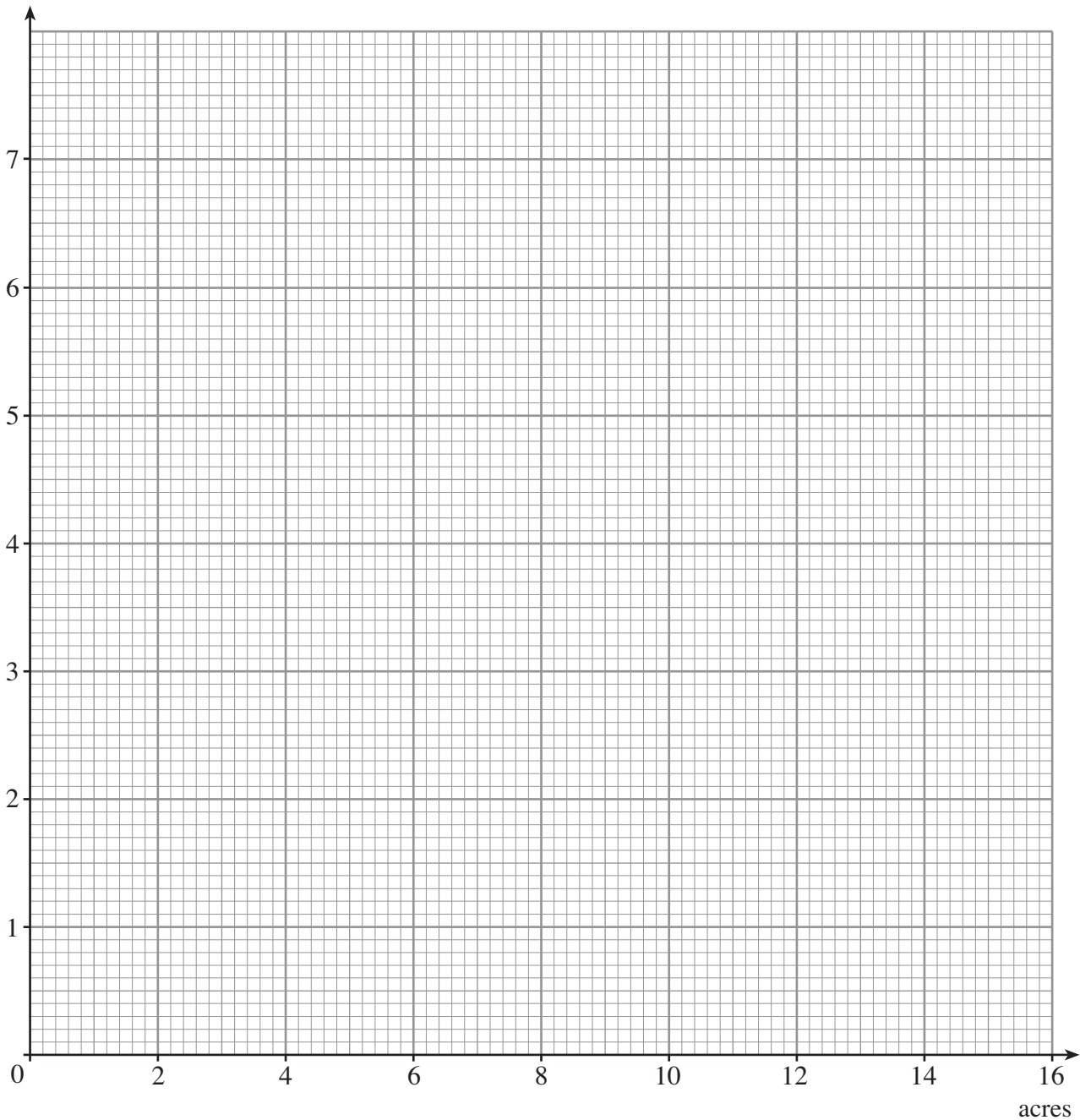
7. (a) A unit used in the imperial system for measuring the area of a field is the **acre**.
The unit used in the metric system is the **hectare**.
The table shows the number of acres and the number of hectares in each of three areas.

Acres	3	9	14
Hectares	1.2	3.6	5.6

Use the data in the table to draw a conversion graph between acres and hectares.

[2]

hectares



- (b) Find an estimate for the number of hectares in 200 acres.

.....

.....

[2]

8. Petra and Steve are organising a packed lunch and a bottle of water for each pupil going on a school trip.

Petra puts the packed lunches into boxes with each box holding 20 lunches.

Steve puts the bottles of water into crates with each crate holding 18 bottles.

When they have finished Petra has filled 45 boxes and Steve has filled 52 crates.

Showing all your calculations, explain whether or not Steve has enough water to give one bottle with each lunch?

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[6]

9. A red box contains four discs numbered 3, 6, 9 and 12 respectively.
 A green box contains four discs numbered 4, 7, 10 and 13 respectively.

In a game, a player takes one disc at random from each of the two boxes.
 The score for the game is the smaller of the two numbers on the discs.

(a) Complete the following table to show all the possible scores.

Green box	13	3	.....	.....	.....
	10	3	.....	.....	.....
	7	3	6	7	7
	4	3	4	4	4
		3	6	9	12
		Red box			

[2]

- (b) A player wins if the score is less than 6.
 It costs 50p to play the game once.
 The prize for winning the game is £1.
 If 80 people play the game once, find the expected profit.

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[6]

10. Helen cycles home from a village that is 30 miles from her home. The travel graph below represents her journey.

(a) How far did Helen cycle in the first hour?

..... [1]

(b) For how many minutes did Helen stop on her journey?

..... [1]

(c) Without calculating any speeds, explain how you can decide whether Helen was cycling faster before stopping or after she had stopped.

..... [1]

(d) At what time did she arrive home?

..... [1]

Distance (in miles)
from Helen's home



11. Sarah and Paige live in Nottingham and are planning a trip to Liverpool. They need to be in Liverpool by 2:00pm. They can travel by train, bus or in Sarah's car. Showing all your reasoning, how do you recommend they travel from Nottingham to Liverpool? Give **one** advantage and **one** disadvantage for your choice of transport.

Part of rail timetable

Nottingham	09:27	10:52	11:44	12:53
Chesterfield	10:20	11:31	12:32	13:32
Manchester	11:37	12:37	13:37	14:37
Warrington	11:57	12:57	13:57	14:57
Liverpool	12:27	13:27	14:28	15:29

Train fare from Nottingham to Liverpool is £39.50 return **each**.

Part of the national bus timetable information

Depart Nottingham	07:15	07:50	09:00
via	Sheffield	Birmingham	Leeds
Arrival Liverpool	11:55	13:35	14:40

Bus fare from Nottingham to Liverpool is £32 return for **two people** travelling together.

Travelling by car

Distance from Nottingham to Liverpool is 105 miles.
 Expected average speed of car on this journey is 35 m.p.h.
 Cost of running Sarah's car is 30p per mile.

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[8]

12. (a) Solve

(i) $\frac{x}{6} = 3,$

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[1]

(ii) $7x - 10 = 11.$

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[2]

(b) Simplify $2a - 7b - 5a - 6b.$

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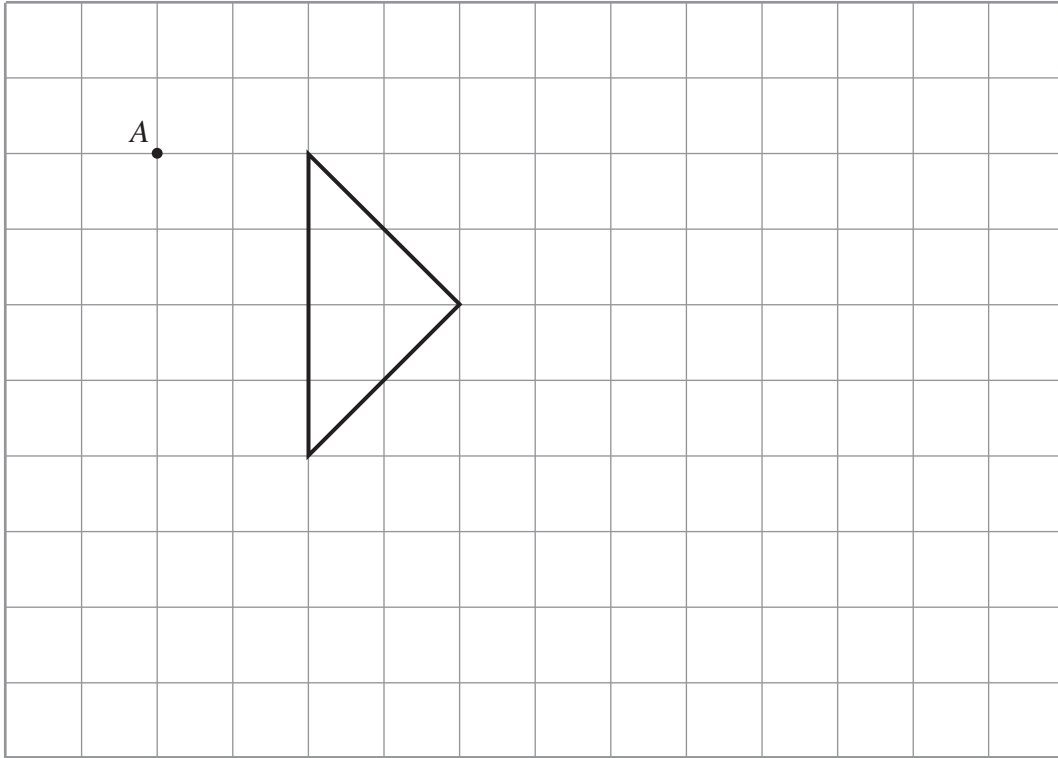
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[2]

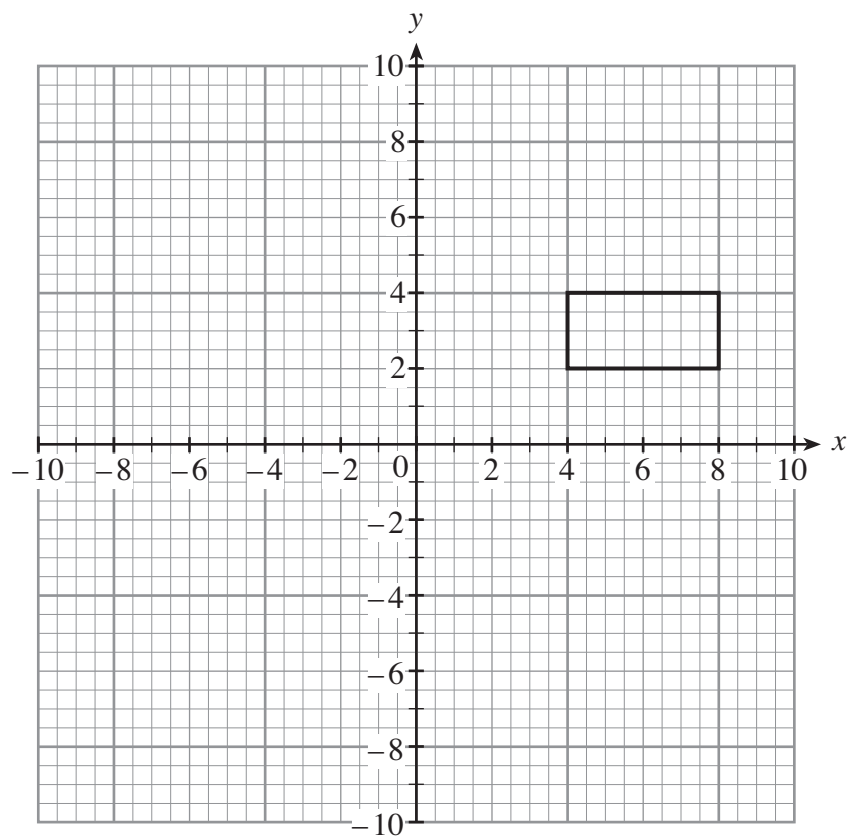
13. (a) Draw an enlargement of the shape shown below using a scale factor of 2.
Use the point A as the centre of the enlargement.

[3]



- (b) Rotate the shape shown below through 90° anticlockwise about the point (2, 1).

[2]



14. (a) Showing all your working, find an estimate for:

$$\frac{503 \times 20.3}{4.1}$$

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[2]

- (b) The value of π is approximately 3.14. Estimate the circumference of a circle with radius 20 cm.

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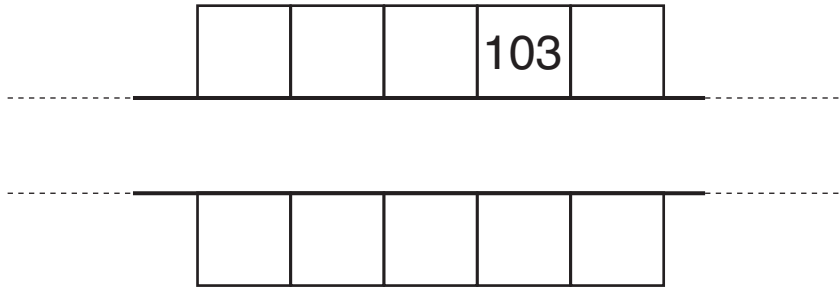
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[2]

15. The houses on one side of a long street have odd numbers and the houses on the other side of the street have even numbers.



- (a) Fill in the numbers on these houses.



[1]

- (b) The numbers on five houses next to each other on one side of the street total 65. What are the numbers on these five houses?

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[3]

- (c) The product of the numbers on two houses which are directly opposite each other is 90. What are the numbers on these two houses?

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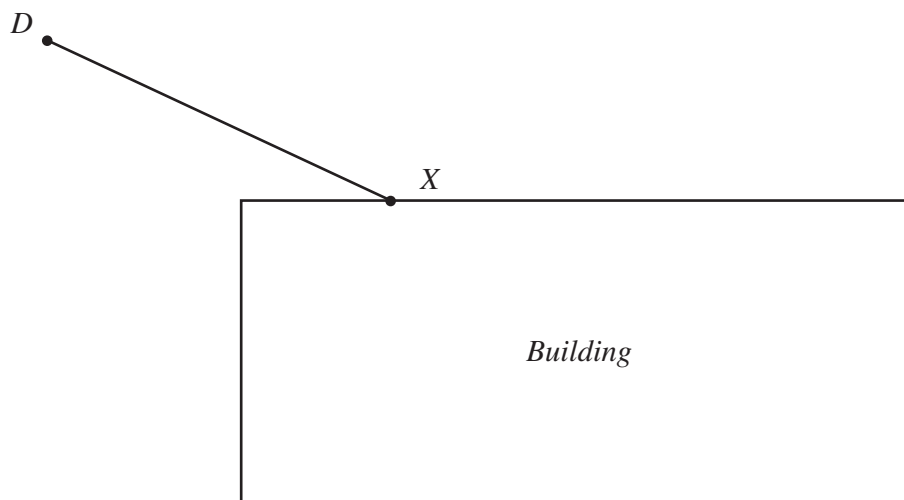
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[1]

16. The diagram represents an aerial view of a building.
A dog, D , on a lead is tied to a side of the building at X .
Draw the boundary of the region in which the dog can roam.

[3]



17. You will be assessed on the quality of your written communication in part (b) of this question.

Mrs. Roberts is travelling to Hong Kong on business.

(a) There is a time difference between the UK and Hong Kong.
When the time is 6 am in the UK the time is 2 pm on the same day in Hong Kong.

(i) When it is 10 am in the UK what time is it in Hong Kong?

.....
[1]

(ii) Mr. Roberts stays in the UK and has given his wife his time schedule, shown below.

<i>6 am</i>	<i>Get up, walk dog, breakfast</i>
<i>6.30 am</i>	<i>Leave home to go to work</i>
<i>7.30 am</i>	<i>Arrive at work</i>
<i>11.30 am</i>	<i>Finish work, set off to go home</i>
<i>12.30 pm</i>	<i>Arrive home for lunch</i>
<i>2 pm</i>	<i>Leave home for daily exercise class</i>
<i>4 pm</i>	<i>Home</i>
<i>6 pm</i>	<i>Go out to evening job</i>
<i>9 pm</i>	<i>Home</i>
<i>10 pm</i>	<i>Go to bed (don't disturb)</i>

Mrs. Roberts will be in meetings most of the day in Hong Kong from 8 am until 11 am, then from 12 noon to 6 pm.
She plans to telephone her husband at a convenient time during the day.
During which time period should Mrs. Roberts telephone her husband?
Give your answer in UK and Hong Kong times.

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[2]

- (b) Mrs. Roberts is going to be in Hong Kong for 4 nights.
She finds two suitable hotels on the internet.

Hotel Gelton 3*	Bed and breakfast £80 per night per person
-----------------	--

Hotel Bear 3*	Dinner, bed and breakfast £107 per night per person
*****Special Offer*****	
Stay 3 nights and your fourth night is free!	

Which hotel should Mrs. Roberts choose? You must show your working and give a reason for your answer.

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[5]

Candidate Name	Centre Number	Candidate Number
		0



GCSE

MATHEMATICS - LINEAR

SPECIMEN PAPER

FOUNDATION TIER

PAPER 2 (Calculator)

$1\frac{3}{4}$ 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 $3\cdot14$ 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.

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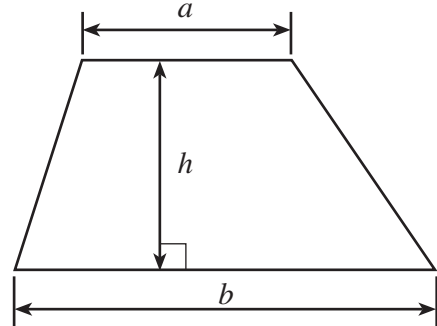
The number of marks is given in brackets at the end of each question or part-question.

You are reminded that assessment will take into account the quality of written communication (including mathematical communication) used in your answer to question **19**.

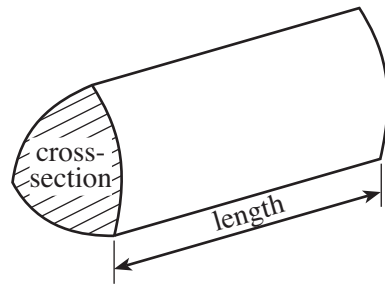
For Examiner's use only		
Question	Maximum Mark	Mark Awarded
1	8	
2	3	
3	8	
4	4	
5	4	
6	4	
7	6	
8	4	
9	6	
10	6	
11	5	
12	3	
13	2	
14	9	
15	7	
16	4	
17	4	
18	3	
19	7	
20	3	
TOTAL MARK		

Formula List

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



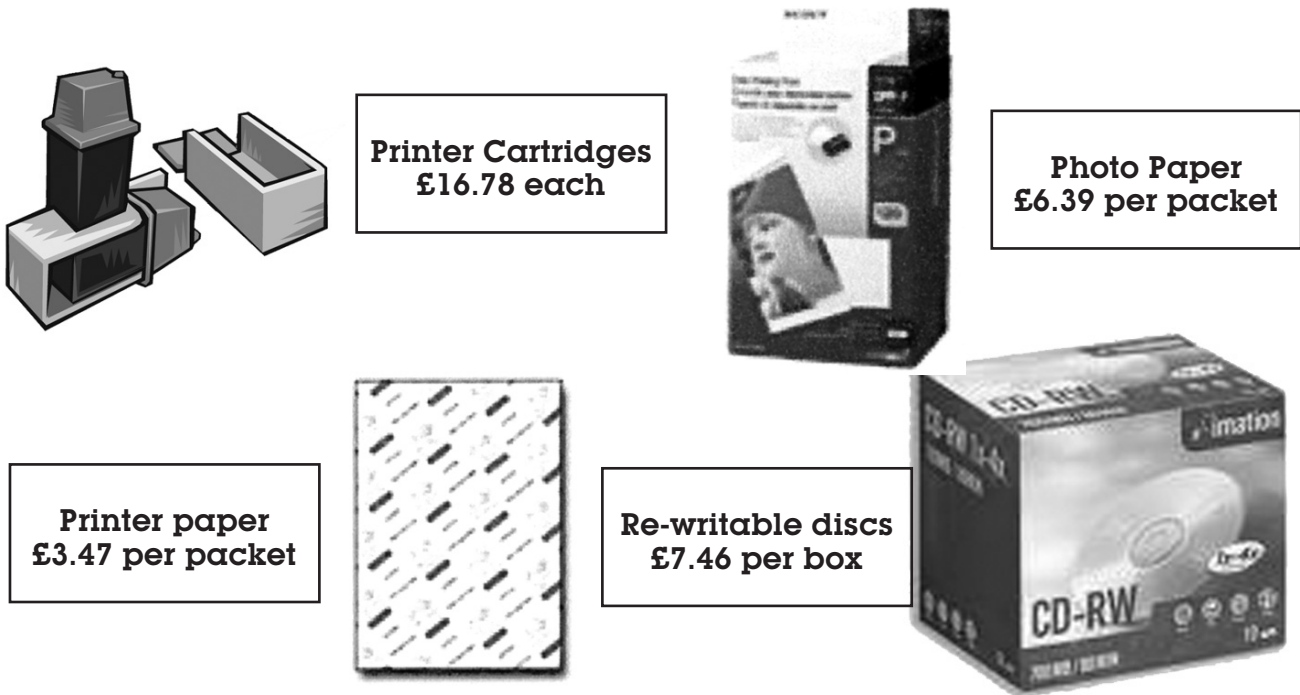
Volume of prism = area of cross-section \times length



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1. Ashley visits a computer store.

(a) She sees the following display.



(i) Ashley buys a box of re-writable discs, 2 packets of photo paper, 3 printer cartridges and 6 packets of printer paper.
Complete the following table to show her bill for these items.

Item	Cost
1 box of re-writable discs	£ 7.46
	£
	£
	£
Total	£

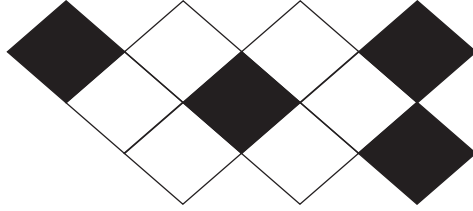
[4]

(ii) The store gives a discount of 5% of the total cost of these items.
What discount does Ashley receive?

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.....

- (b) (i) What percentage of the following shape is shaded?

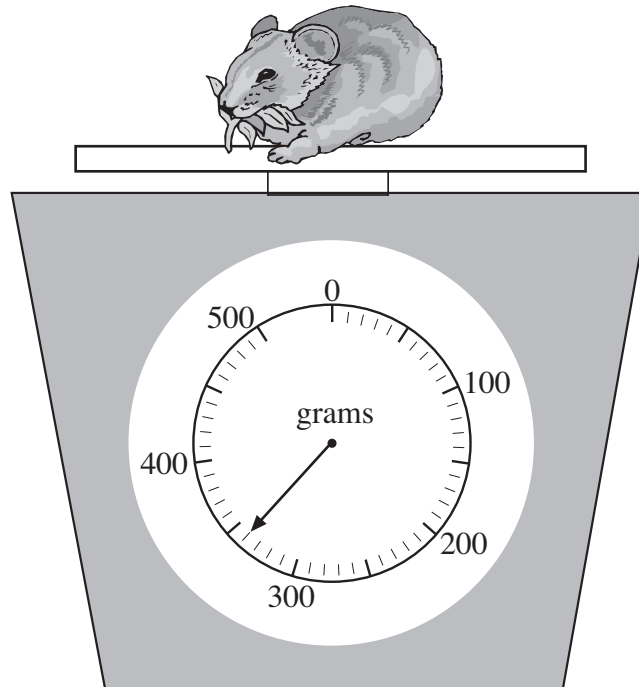


.....
[1]

- (ii) What percentage of the shape is NOT shaded?

.....
[1]

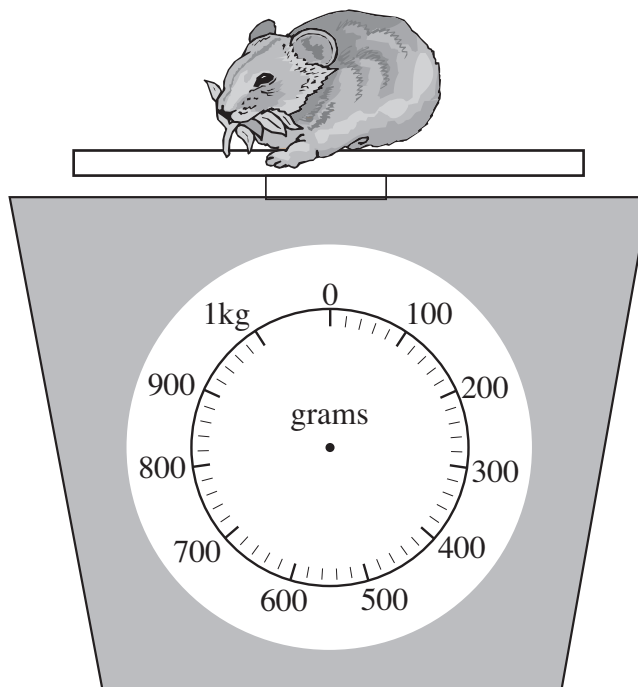
2. (a) (i) What is the mass of Mia's pet hamster?



The mass of Mia's pet hamster is g.

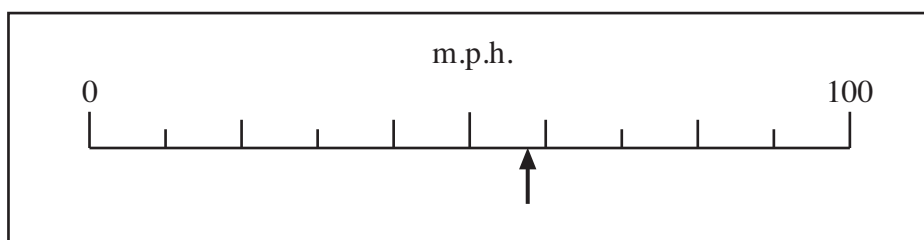
[1]

- (ii) She puts her hamster on a different scale.
Draw the pointer to show the hamster's mass.



[1]

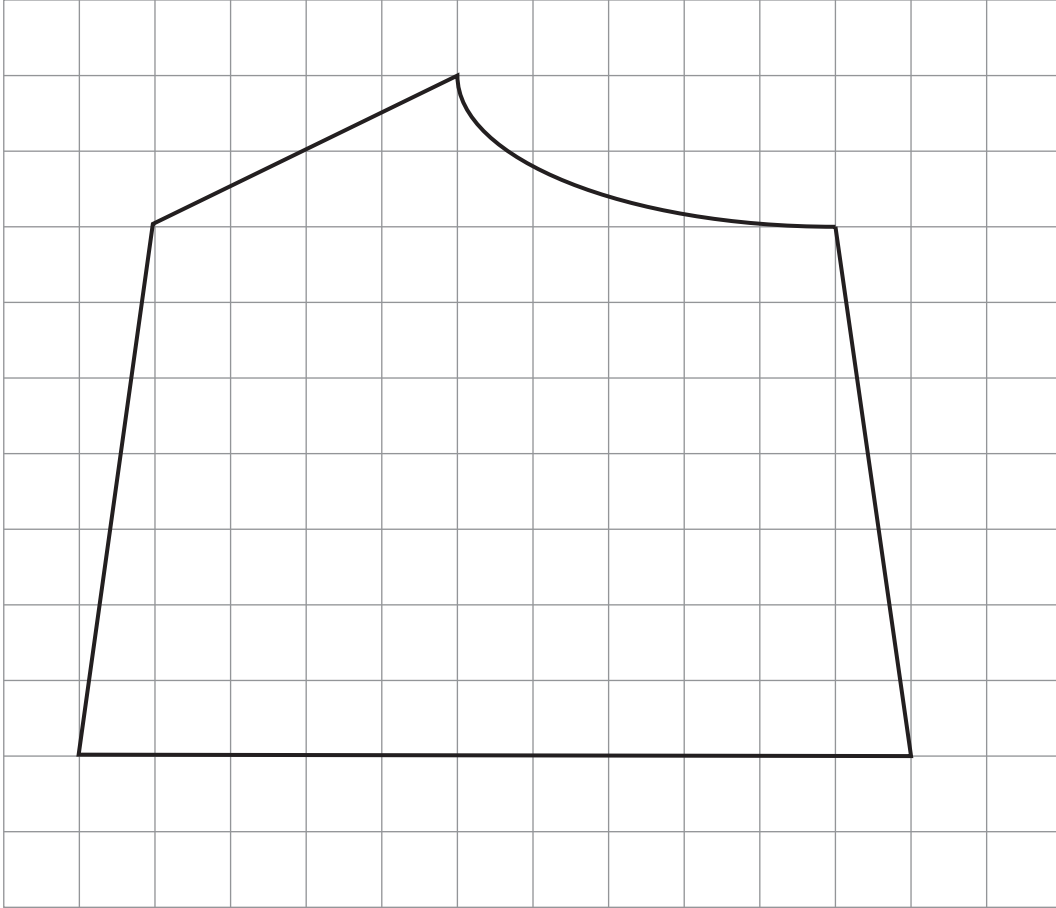
- (b) Mia goes out in her car.
What speed is she doing, correct to the nearest 10 miles per hour?



..... m.p.h.

[1]

3. (a)



The above shape, drawn on a square grid, represents a large garden.
Estimate the area of the garden if every square represents an area of 5 m^2 .

.....

.....

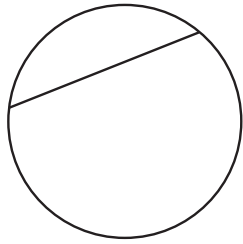
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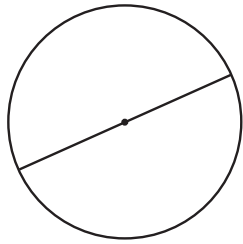
[3]

(b) Write down the special name of the straight line shown in each diagram below.

[2]

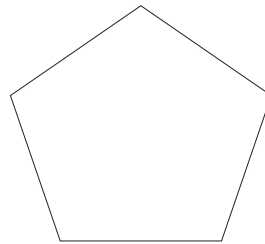
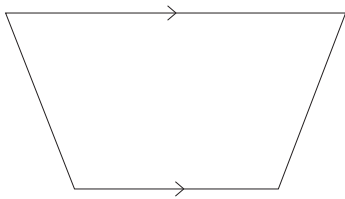


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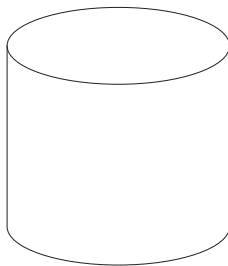
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(c) Write down the name of each of the shapes shown below.



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.....

[3]

4. The formula to find the **Total Cost**, in pounds, of hiring a carpet cleaner is

$$\text{Total Cost} = \text{Number of days} \times \text{£}6.75 + \text{Hire charge.}$$

- (a) Find the **Total Cost** when the **Number of days** is 3 and the **Hire charge** is £10.

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[2]

- (b) Find the **Number of days**, when the **Total Cost** is £61 and the **Hire charge** is £7.

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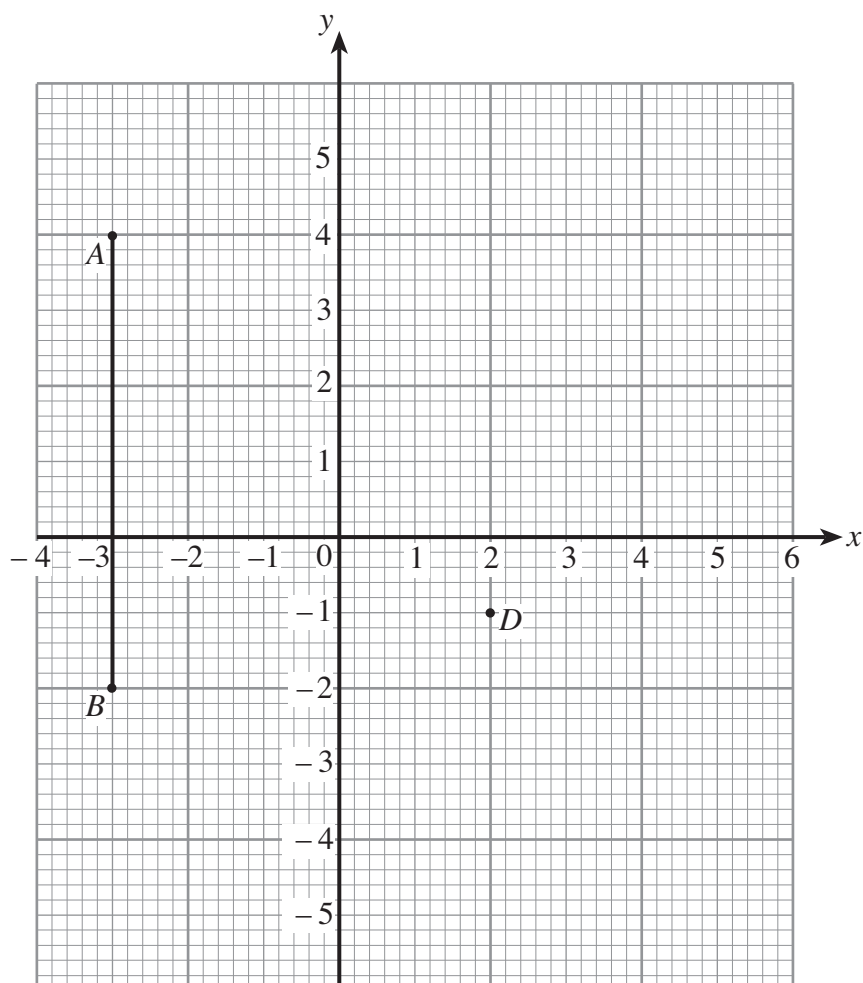
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[2]

5.



- (a) Write down the coordinates of the points A and B .

Coordinates of A are (..... ,) Coordinates of B are (..... ,)

[2]

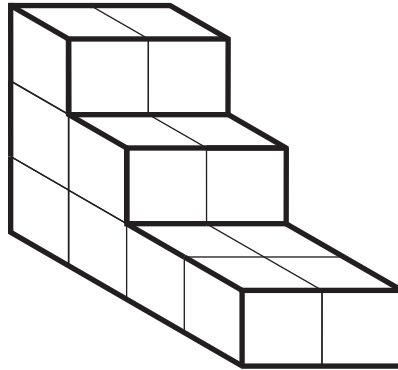
- (b) C is the mid-point of AB .
Mark the point C on the graph paper above.

[1]

- (c) The perpendicular to the line AB from the point D meets AB at the point E .
Mark the point E on the graph paper above.

[1]

6. (a) The diagram shows a number of cubes of side 1 cm forming a solid shape.



Find the volume of the shape and state the units of your answer.

.....

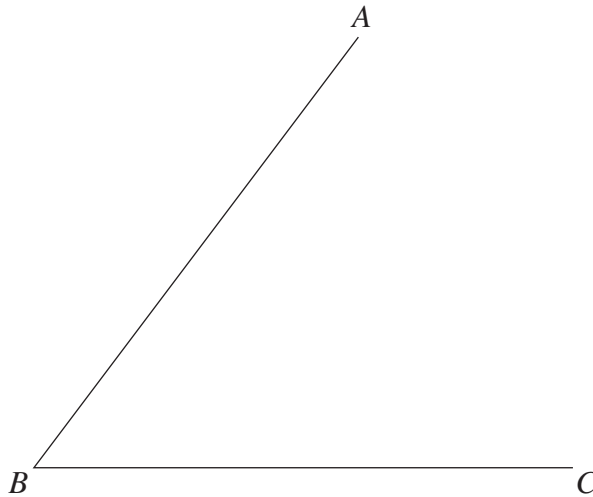
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Volume of the shape =

[2]

- (b) (i) Measure the size of \widehat{ABC} .

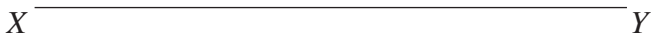
[1]



$\widehat{ABC} = \dots\dots\dots^\circ$

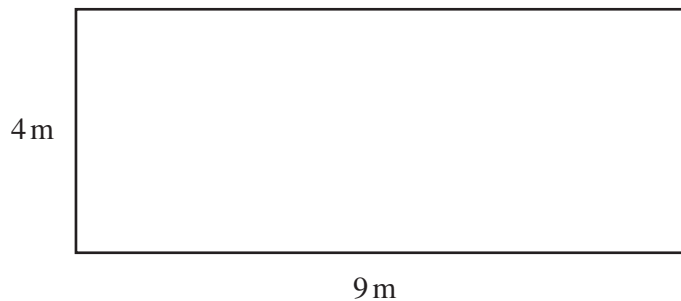
- (ii) On the diagram below, draw \widehat{XYZ} , which is 124° .

[1]



7. Sian, Ryan and Dafydd are neighbours and have houses on a new housing estate.

Sian makes a rectangular front lawn measuring 9 m by 4 m.



- (a) Ryan makes a square lawn, which has the same perimeter as Sian's lawn.
Find the length of a side of Ryan's lawn.

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[3]

- (b) Dafydd also makes a square lawn, but his lawn has the same area as Sian's lawn.
Find the length of a side of Dafydd's lawn.

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[3]

8.



The above picture shows two houses each with a front door.

Write down an **estimate** for the **actual height** of a door.

Using this estimate for the height of a door, estimate the **actual distance** between the two houses shown by the arrowed line.

You must show all your working.

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[4]

9. (a) (i) The mass of a donkey is x kg. During the year the donkey's mass increases by 8 kg. What is the mass of the donkey at the end of the year?

.....
[1]

- (ii) A pencil costs 32 pence. What is the cost of g pencils?

.....
[1]

- (b) Describe **in words** the rule for continuing **each** of the following sequences.

- (i) 48, 42, 36, 30,

Rule:

.....
[1]

- (ii) 2, 8, 32, 128,

Rule:

.....
[1]

- (c) Solve each of the following equations.

- (i) $6x = 48$

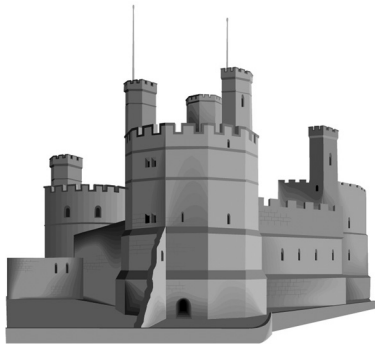
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[1]

- (ii) $y + 6 = 19$

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[1]

10.

Arthur's Castle



Entrance
Adult £7 Child £4

Parking
Cars £3 Minibuses £5 Coaches £8

A group of 3 adults and a number of children travel in a minibus to visit Arthur's Castle.

It costs a total of £58 to park the minibus and pay for the tickets for everyone to visit the castle.

How many were there in the group altogether?

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[6]

11. Fran needs at least £800 in euros (€) to go on a visit to France.
When he goes to the bank he finds that the lowest euro note the bank will give him is the 5 euro note.
The exchange rate is £1 = €1.14.

What is the least number of euros that Fran buys to ensure he has at least £800 worth and how much did he pay for them?

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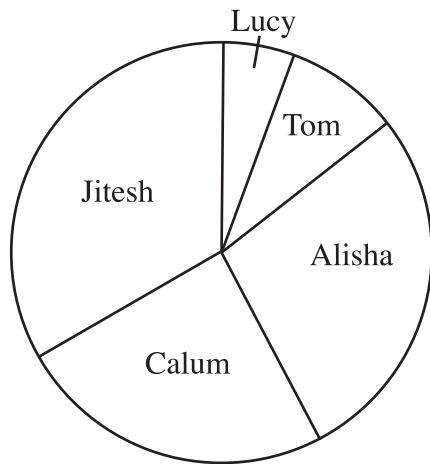
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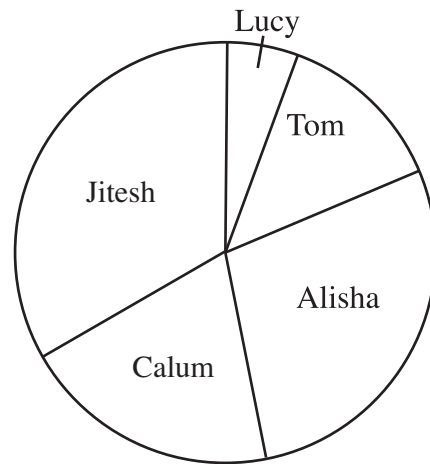
12. Year 11 and 12 pupils in a comprehensive school were asked:

“In the election for a pupil governor, for whom would you vote?”

The two pie charts below were drawn by a pupil to illustrate the results for Year 11 and Year 12 separately.



Year 11



Year 12

(a) Estimate the fraction of Year 11 pupils who would vote for Jitesh.

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[1]

(b) Can you tell from the pie charts whether fewer Year 11 pupils than Year 12 pupils would vote for Tom?

Put a circle around your choice.

Yes / No

Explain the reasoning for your answer.

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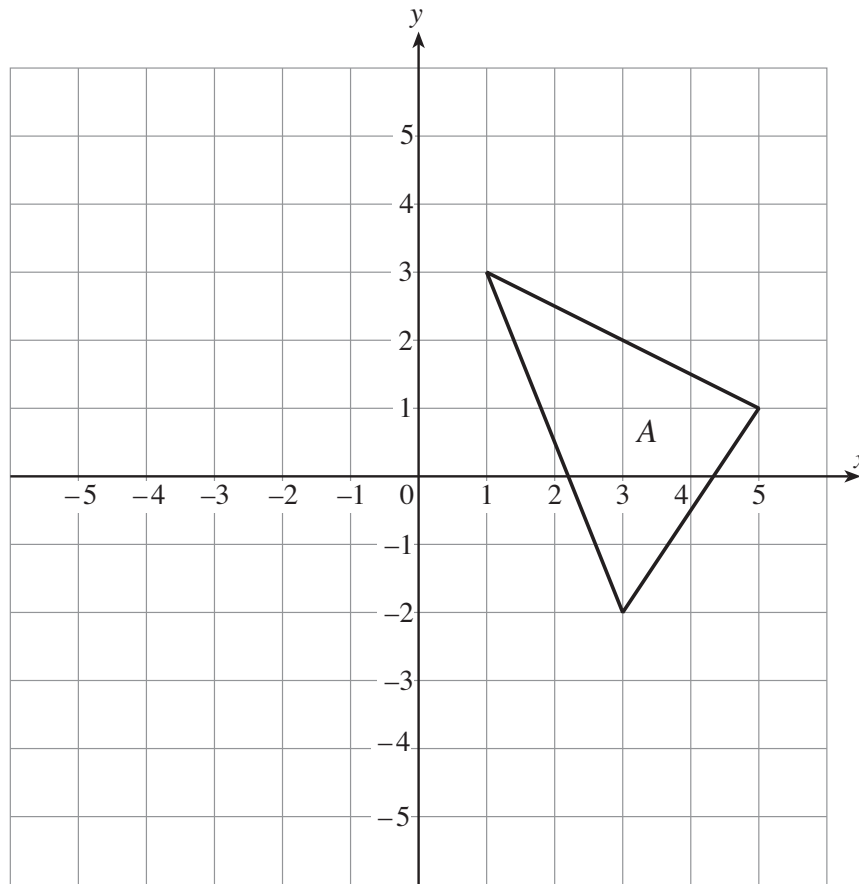
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[2]

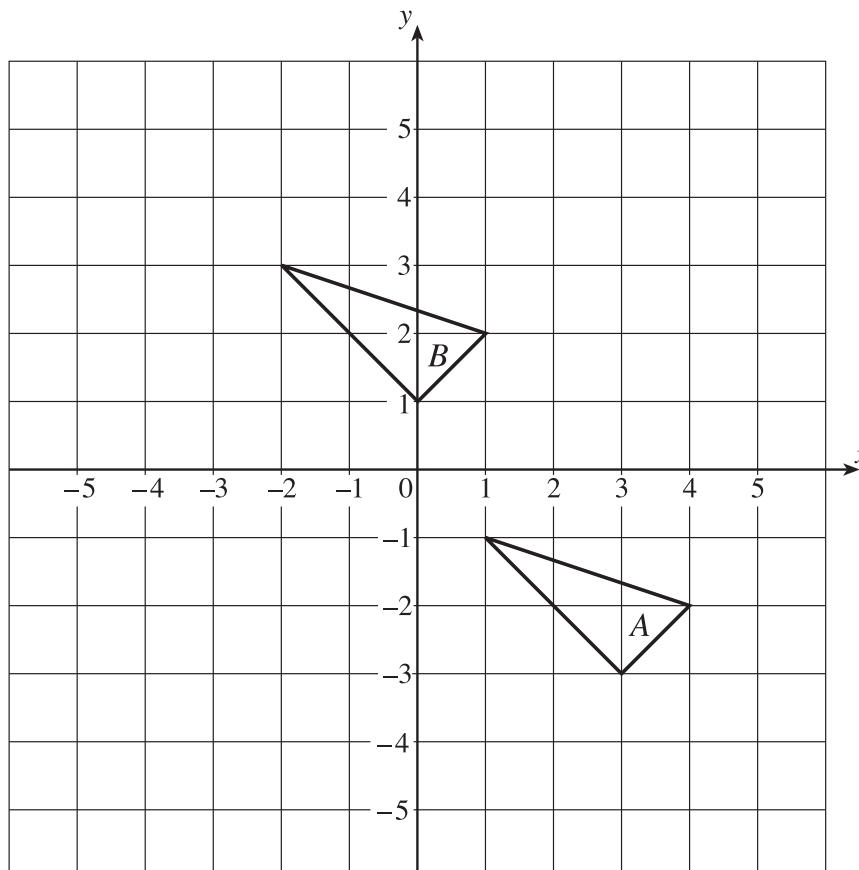
13. (a) Reflect the triangle A in the y -axis.

[1]



- (b) In the diagram below, describe the translation that maps A to B .

[1]



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14. (a) The diagram on the next page, drawn to the scale of 1 cm represents 10 km, shows a coastline with harbours at A and B. Find the actual distance, in kilometres, between the two harbours.

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[3]

- (b) At 1:00 pm a ship sets off from A and another ship sets off from B. Each ship travels in a straight line. The ship from A maintains an average speed of 40 km/hour whilst the ship from B keeps to an average speed of 30 km/hour. The ships meet at 4:00 pm. Giving full details of your working and reasoning, find the position where the two ships meet. Write down the bearing of this point from B.

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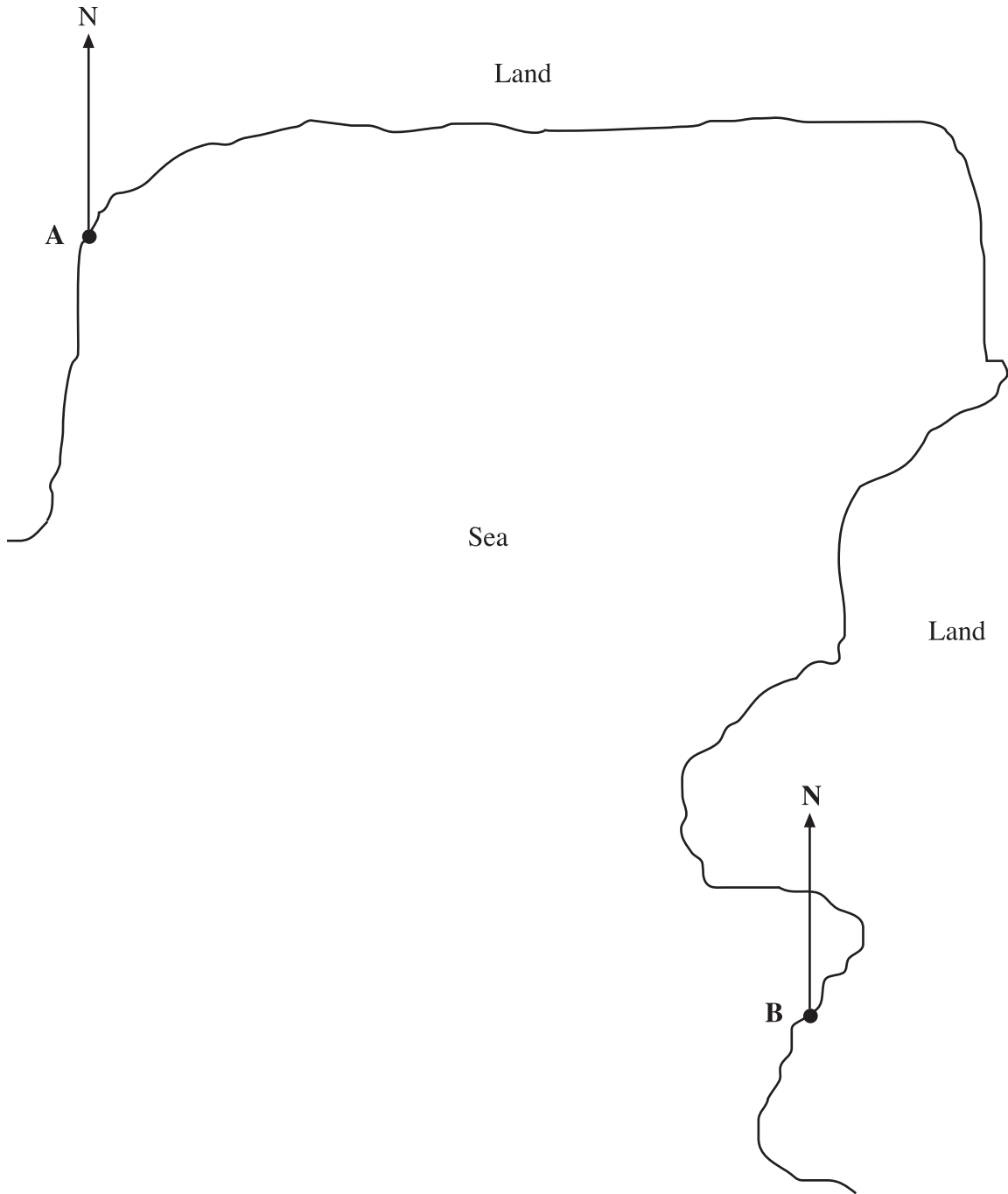
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[6]

For use with question 14.

Scale: 1 cm represents 10 km



15. The owner of a takeaway coffee shop uses two types of paper cups.

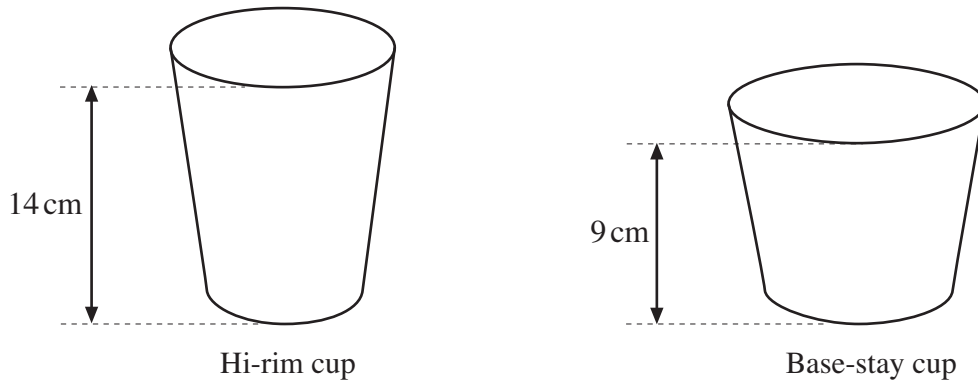


Diagram not drawn to scale.

A diagram of how the cups stack is shown below.

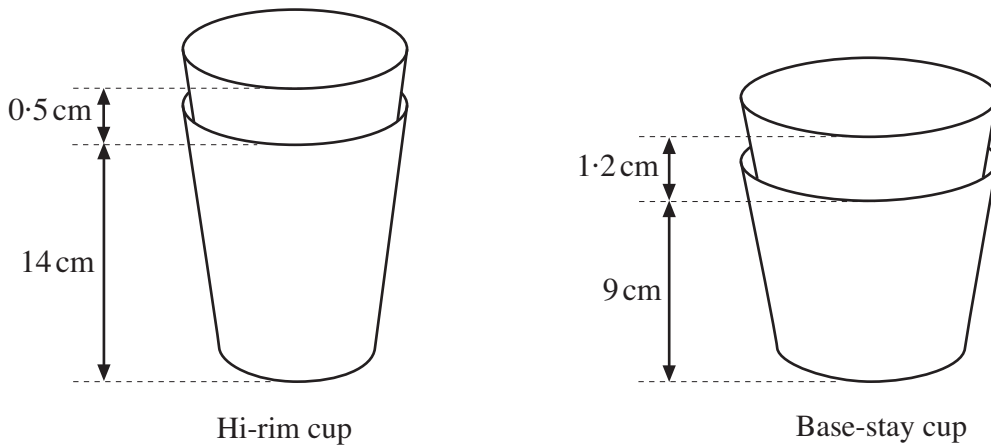


Diagram not drawn to scale.

(a) How high is a stack of 25 Hi-rim cups?

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[2]

(b) A stack of Base-stay cups is 18.6 cm high.
How many Base-stay cups are in the stack?

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[2]

- (c) A stack of Hi-rim cups is the same height as a stack of Base-stay cups.
There are 21 Base-stay cups in the stack.
How many cups are there in the stack of Hi-rim cups?

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[3]

16. (a) Find the value of $3 \cdot 7^2 + \sqrt{21 \cdot 16}$.

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[1]

- (b) In a shop, the marked price of a television is £542.
The shop offers a discount of 28% of the marked price.
Find the discounted price of the television.

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[3]

17. The table below shows the probabilities of selecting one ball at random from a bag of coloured balls.

Colour	Red	Black	Yellow	White	Purple
Probability	0.25	0.14	0.06	0.15	0.40

- (a) Are there any balls of another colour in the bag? Give a reason for your answer.

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[2]

- (b) What is the probability of selecting either a yellow or a purple ball?

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[2]

18. Solve the equation $6x - 7 = 4(x + 3)$.

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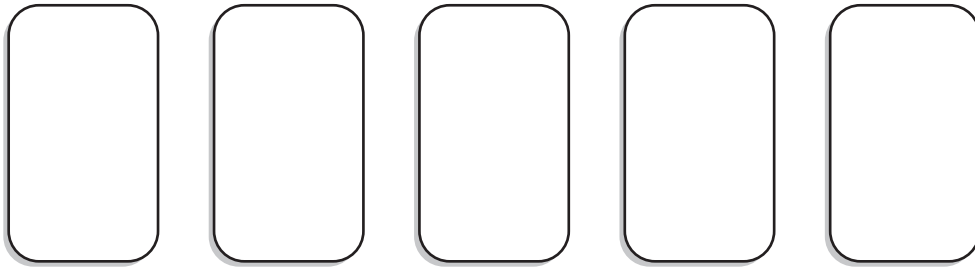
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[3]

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



A number is written on each of five cards.

The cards are arranged in ascending order.

It is known that the mean of the five numbers is 9.6, the range is 12, the median is 10, the greatest number is 16 and the fourth number is twice the second number.

Explaining your reasoning, find the five numbers written on the cards.

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[7]

20. Jaspal invests £2500 for 2 years at 7% per annum compound interest.
What is the value of his investment after 2 years?

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[3]

Candidate Name	Centre Number	Candidate Number
		0



GCSE
MATHEMATICS - LINEAR
SPECIMEN PAPER
HIGHER TIER
PAPER 1 (Non-calculator)

2 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.

Calculators are **not** allowed for this paper.

Take π as 3.14.

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.

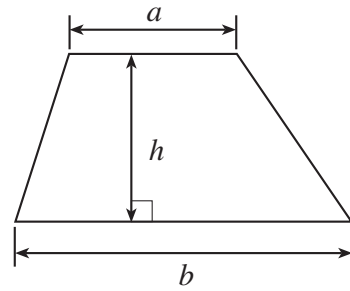
The number of marks is given in brackets at the end of each question or part-question.

You are reminded that assessment will take into account the quality of written communication (including mathematical communication) used in your answer to question **6(b)**.

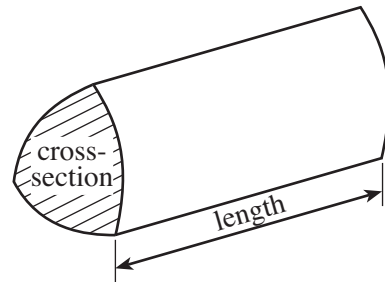
For Examiner's use only		
Question	Maximum Mark	Mark Awarded
1	8	
2	3	
3	5	
4	3	
5	5	
6	13	
7	6	
8	3	
9	3	
10	7	
11	6	
12	4	
13	5	
14	9	
15	4	
16	5	
17	7	
18	4	
TOTAL MARK		

Formula List

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

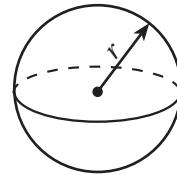


Volume of prism = area of cross-section \times length



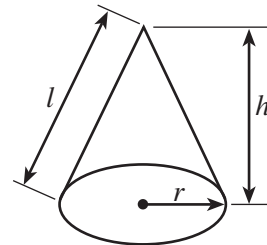
Volume of sphere = $\frac{4}{3}\pi r^3$

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



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

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

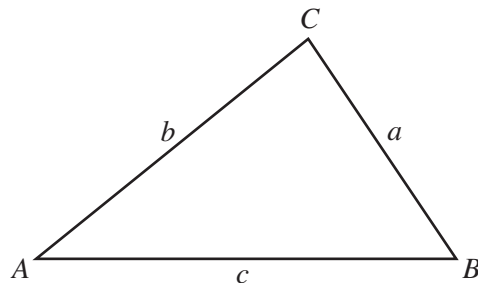


In any triangle ABC

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) Given that 20kg is approximately 44 lb (pounds), complete the statement below.

1 kg = lb (pounds)

[1]

(b) The label on a pack of cheese reads:

10 litres of milk make 1 lb (pound) of cheese

Calculate how many litres of milk are needed to make 15kg of cheese.

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[3]

(c) The label on the pack of cheese also states:

Typical value per 100 g:	
Energy	1700 kJ 410 kcal
Protein	25.0 g
Carbohydrate	0.1 g
Fat	34.4 g

Calculate the amount of protein in 1.5kg of cheese. Give your answer in grams.

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[4]

2. Calculate the size of each of the angles marked x , y and z in the diagram below.

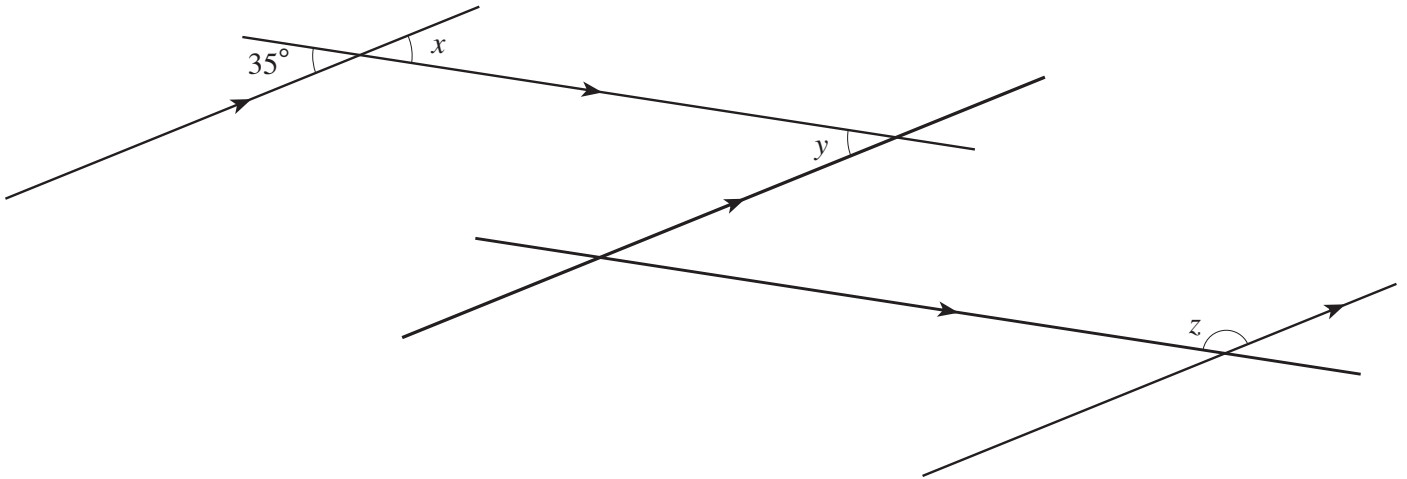


Diagram not drawn to scale.

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

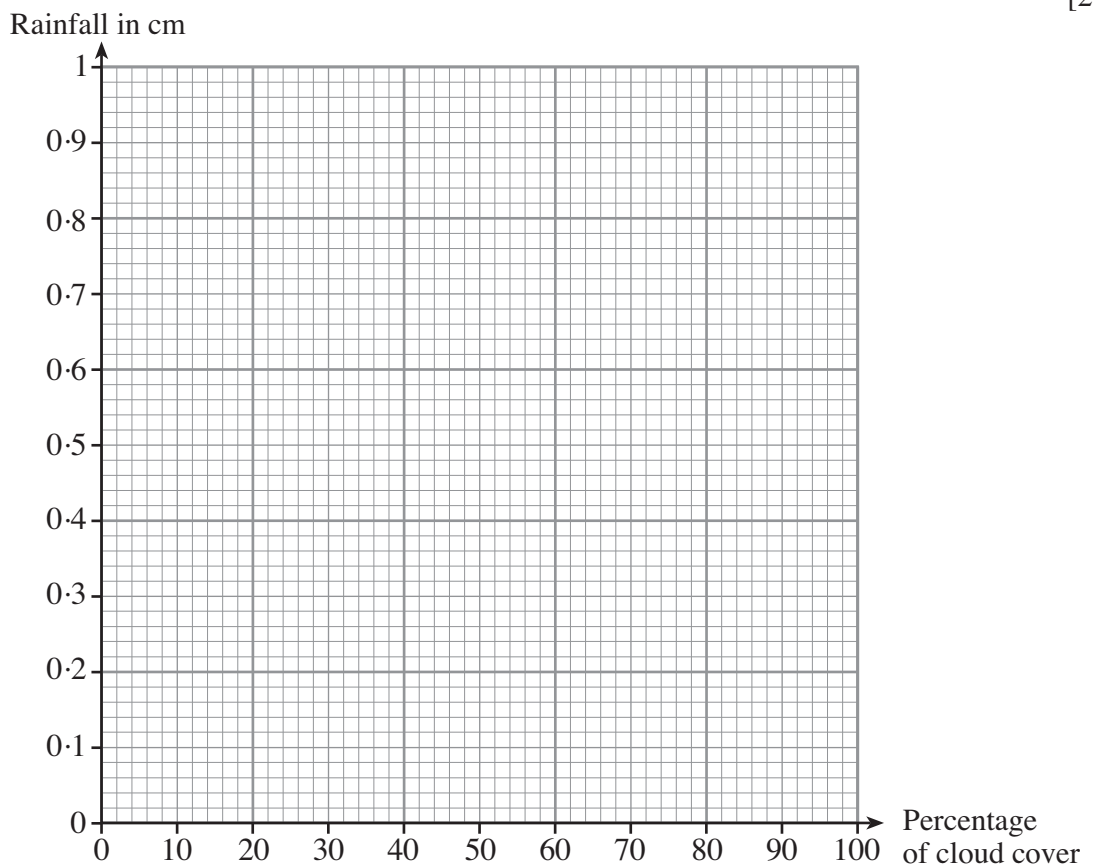
[3]

3. Every Saturday for 5 weeks in the Autumn the number of centimetres of rainfall and the average percentage of cloud cover were recorded by a group of students. The table below shows the results.

Percentage of cloud cover	55	10	60	85	5
Centimetres of rainfall	0.48	0.24	0.52	0.84	0.10

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

[2]



- (b) Describe the correlation between the average percentage of cloud cover and the amount of rainfall.

[1]

- (c) Find an estimate of the average percentage of cloud cover on a day with 0.6 cm of rainfall clearly showing your method.

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[2]

4. The diagram shows a triangle DEF with $EF = 11$ cm, $\widehat{DXF} = 90^\circ$ and $DX = 7$ cm.

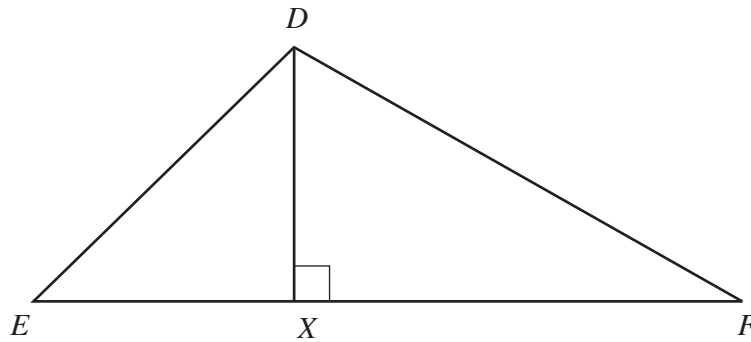


Diagram not drawn to scale.

Find the area of the triangle DEF . State appropriate units for your answer.

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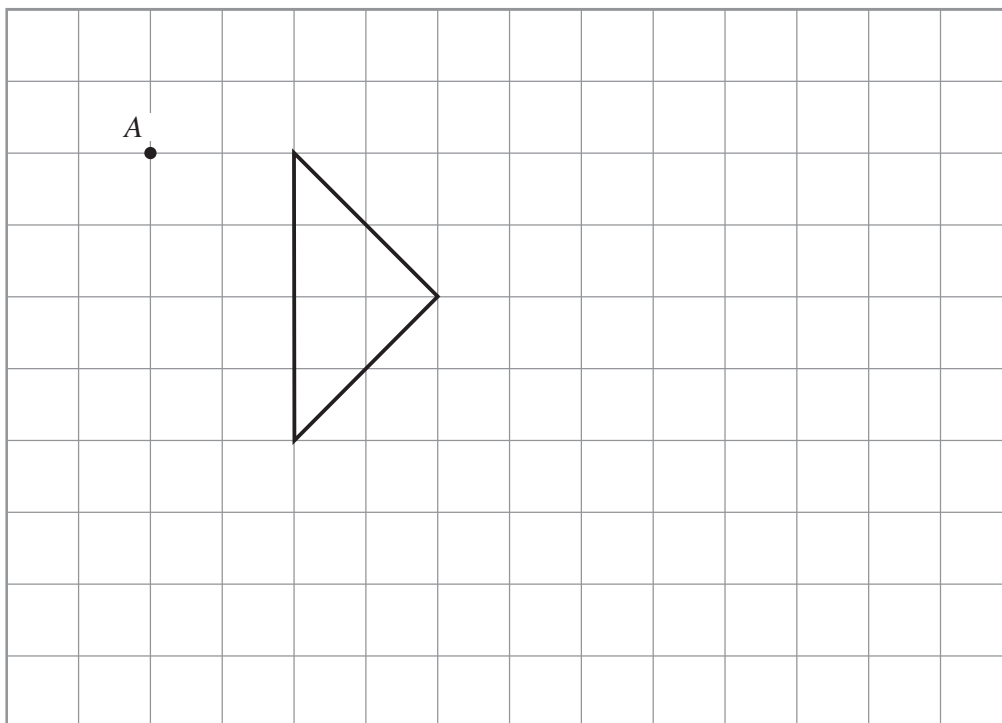
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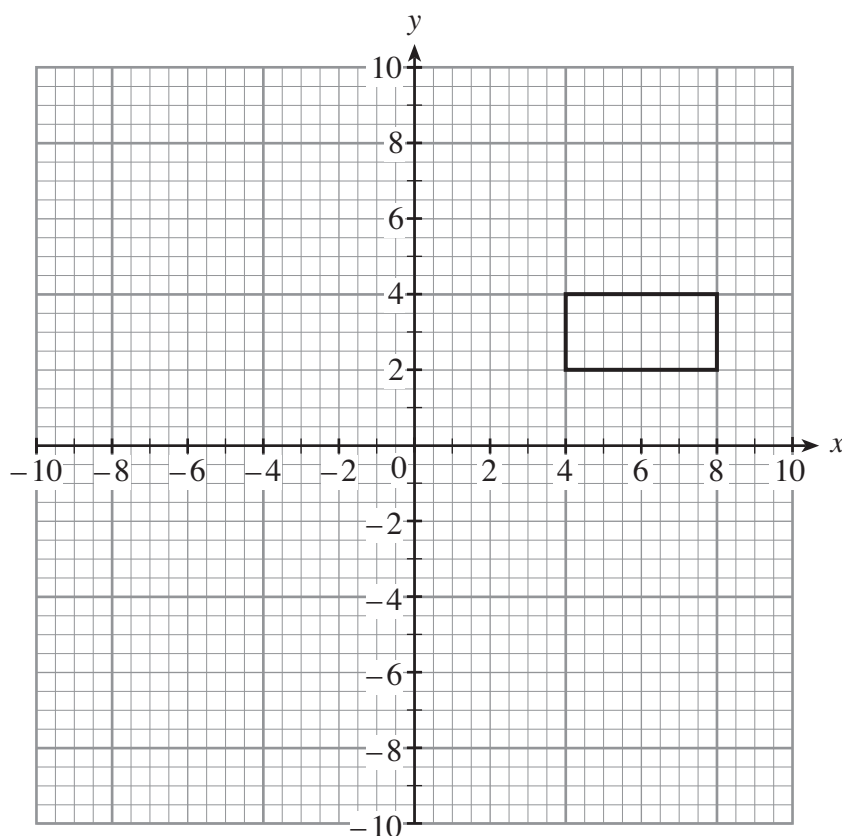
5. (a) Draw an enlargement of the shape shown below using a scale factor of 2. Use the point A as the centre of the enlargement.

[3]



- (b) Rotate the shape shown below through 90° anticlockwise about the point $(2, 1)$.

[2]



6. You will be assessed on the quality of your written communication in part (b) of this question.

Mrs. Roberts is travelling to Hong Kong on business.

(a) There is a time difference between the UK and Hong Kong.
When the time is 6 am in the UK the time is 2 pm on the same day in Hong Kong.

(i) When it is 10 am in the UK what time is it in Hong Kong?

..... [1]

(ii) Mr. Roberts stays in the UK and has given his wife his time schedule, shown below.

6 am	Get up, walk dog, breakfast
6.30 am	Leave home to go to work
7.30 am	Arrive at work
11.30 am	Finish work, set off to go home
12.30 pm	Arrive home for lunch
2 pm	Leave home for daily exercise class
4 pm	Home
6 pm	Go out to evening job
9 pm	Home
10 pm	Go to bed (don't disturb)

Mrs. Roberts will be in meetings most of the day in Hong Kong from 8 am until 11 am, then from 12 noon to 6 pm.
She plans to telephone her husband at a convenient time during the day.
During which time period should Mrs. Roberts telephone her husband? Give your answer in UK and Hong Kong times.

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[2]

(b) Mrs. Roberts is going to be in Hong Kong for 4 nights. She finds two suitable hotels on the internet.

Hotel Gelton 3*	Bed and breakfast £80 per night per person
-----------------	--

Hotel Bear 3*	Dinner, bed and breakfast £107 per night per person
*****Special Offer*****	
Stay 3 nights and your fourth night is free!	

Which hotel should Mrs. Roberts choose? You must show your working and give a reason for your answer.

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[5]

(c) The currency in Hong Kong is dollars, (\$). Mrs. Roberts changes £400 into dollars. She returns from Hong Kong with \$1500. The bank gives the exchange rates shown below.

Going on holiday	\$15 = £1
Back from holiday	\$17 = £1

(i) How much of the £400 did Mrs. Roberts spend when in Hong Kong? Give your answer in **dollars**.

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[3]

(ii) On return from her business trip Mrs. Roberts exchanges \$1500 for pounds. Will she receive **more** or **less** than £100? You must give a reason for your answer.

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[2]

7. The houses on one side of a long street have odd numbers and the houses on the other side of the street have even numbers.

1	3	5	7	9		
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2	4	6				
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- (a) Fill in the numbers on these houses.

			103	
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[1]

- (b) The numbers on five houses next to each other on one side of the street total 65. What are the numbers on these five houses?

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[3]

- (c) The product of the numbers on two houses which are directly opposite each other is 380. What are the numbers on these two houses?

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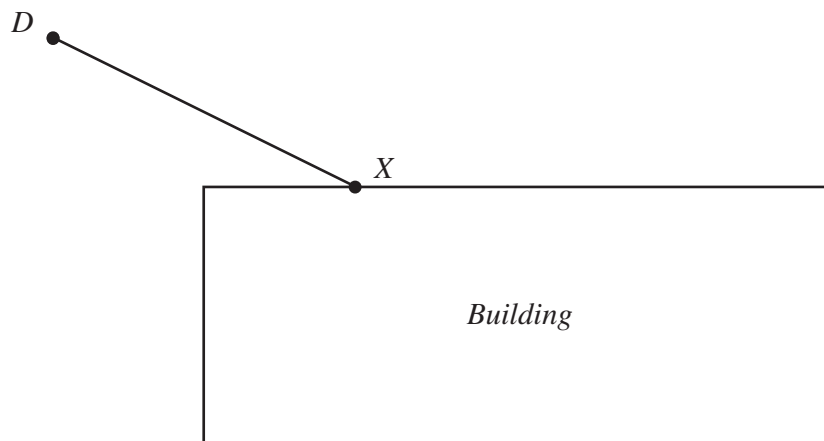
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[2]

8. The diagram represents an aerial view of a building.
A dog, D , on a lead is tied to a side of the building at X .
Draw the boundary of the region in which the dog can roam.

[3]



9. (a) Expand $y(4y^3 + 1)$.

[2]

(b) Simplify $\frac{t^6}{t^2}$.

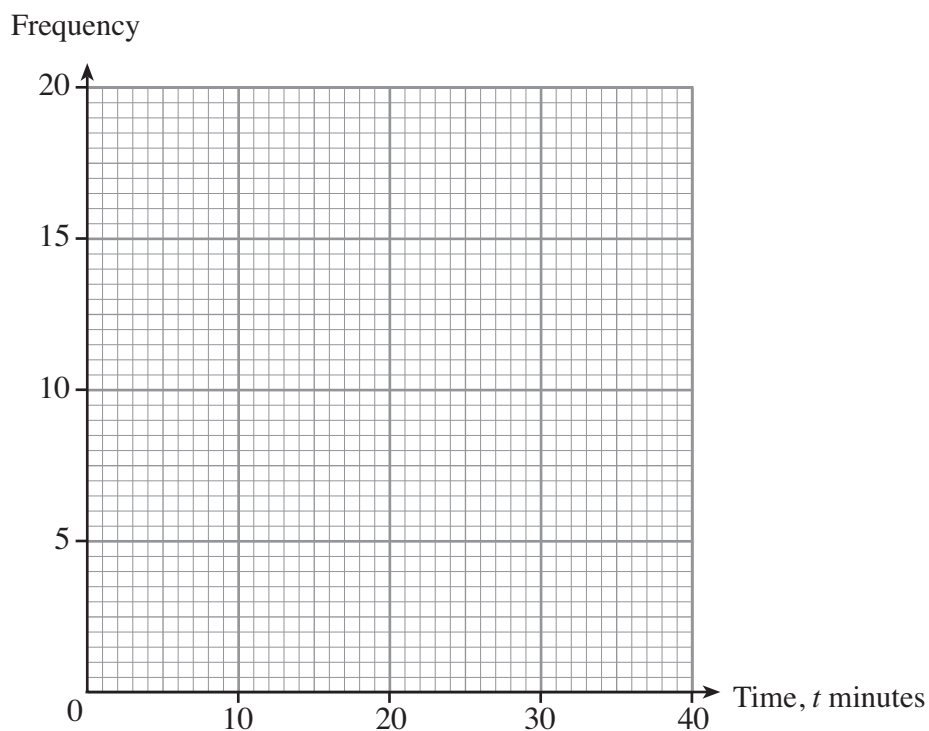
[1]

10. (a) A teacher recorded the time taken by each of 30 pupils in her class to complete a task. The table below shows a summary of her results.

Time taken (t minutes)	Frequency
$0 < t \leq 10$	14
$10 < t \leq 20$	10
$20 < t \leq 30$	4
$30 < t \leq 40$	2

- (i) On the graph paper below draw a frequency polygon for this data.

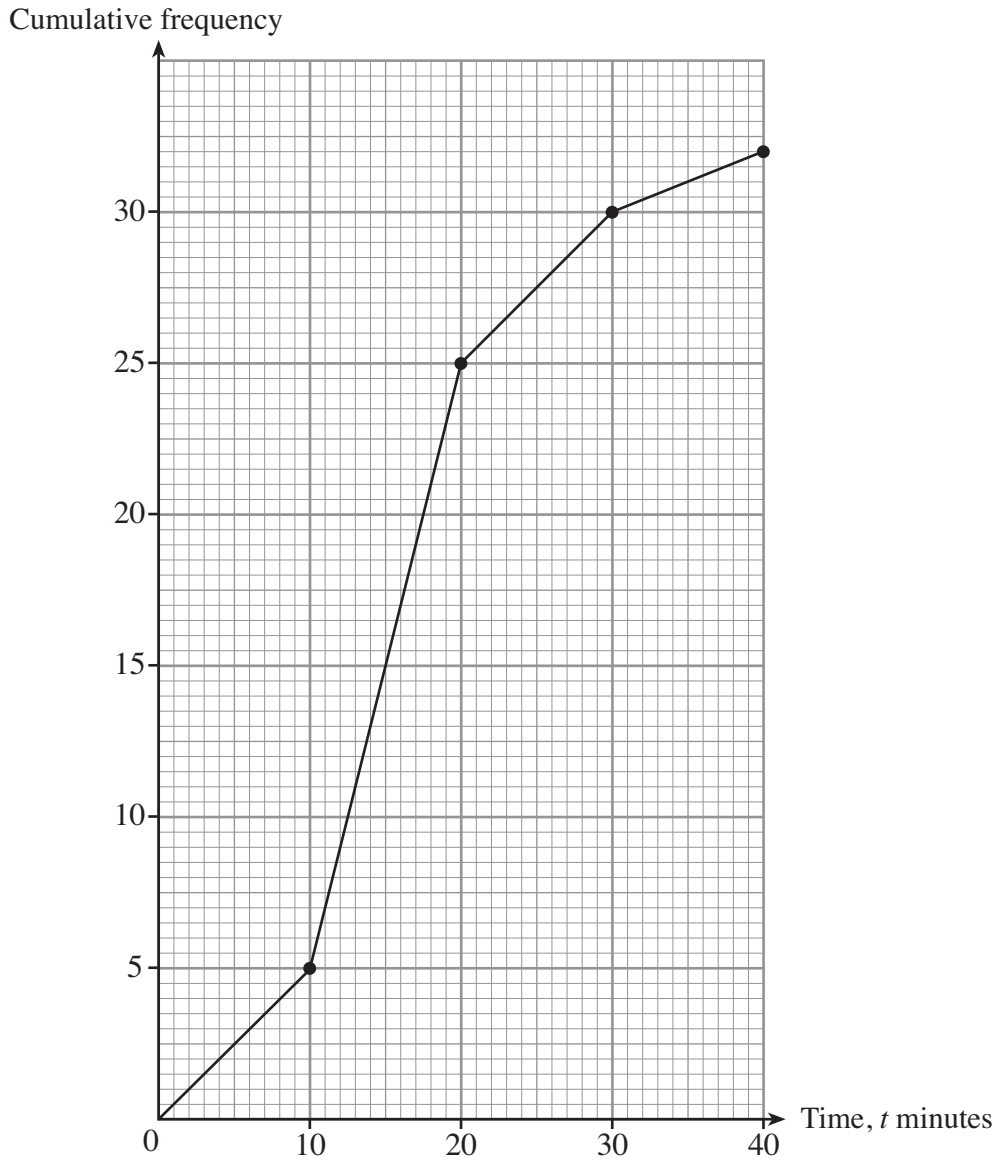
[2]



- (ii) Using the table, give the class interval which contains the median time taken.

[1]

- (b) Another teacher recorded the times taken to complete the same task for his class of 32 pupils and he drew the following cumulative frequency diagram.



Use the cumulative frequency diagram to find an estimate for the interquartile range.

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[2]

- (c) Is it possible for the median times of the two classes to be the same?
Give a reason for your answer.

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[2]

11. A pyramid has a perpendicular height of x cm and a base area of 18 cm^2 .
A cuboid of height 10 cm has a base in the shape of a square of side x cm.

(a) Show that the volume of the pyramid is $6x \text{ cm}^3$.

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[1]

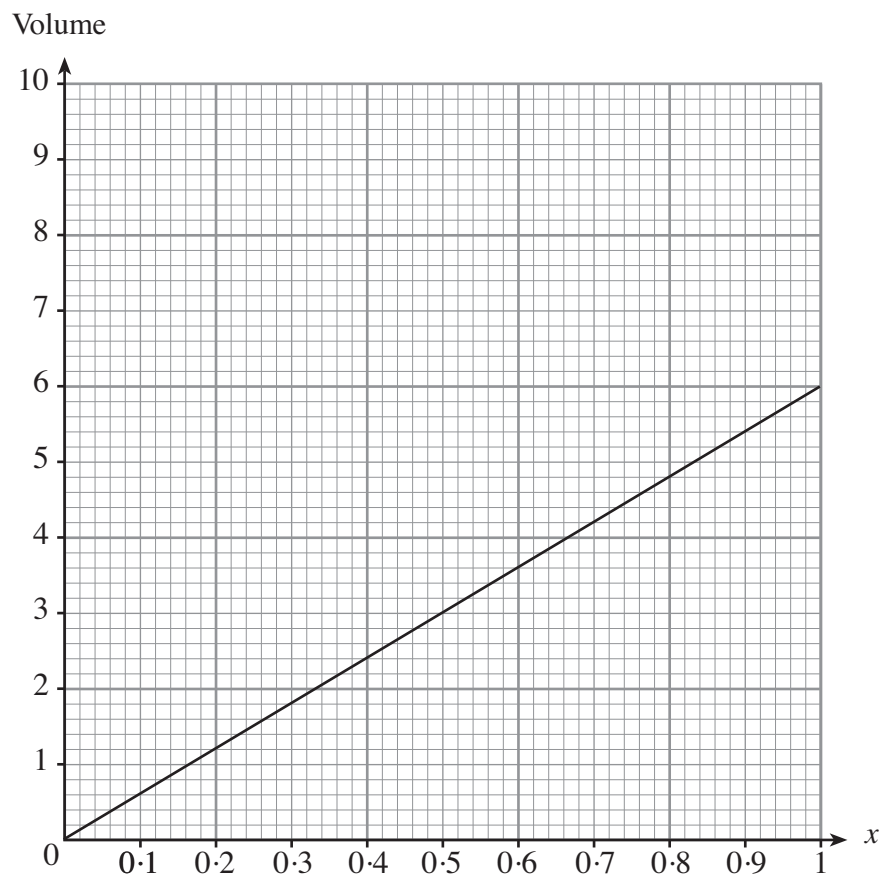
(b) Write down an expression for the volume of the cuboid in terms of x .

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[1]

(c) On the diagram below, the graph drawn shows the volume of the pyramid for values of x from 0 to 1.



On the same diagram, draw a graph to show the volume of the cuboid for values of x from 0 to 1 using the values in the following table.

x	0	0.2	0.4	0.6	0.8	1
Volume						

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[3]

(d) Explain what the intersection of the two graphs tells you.

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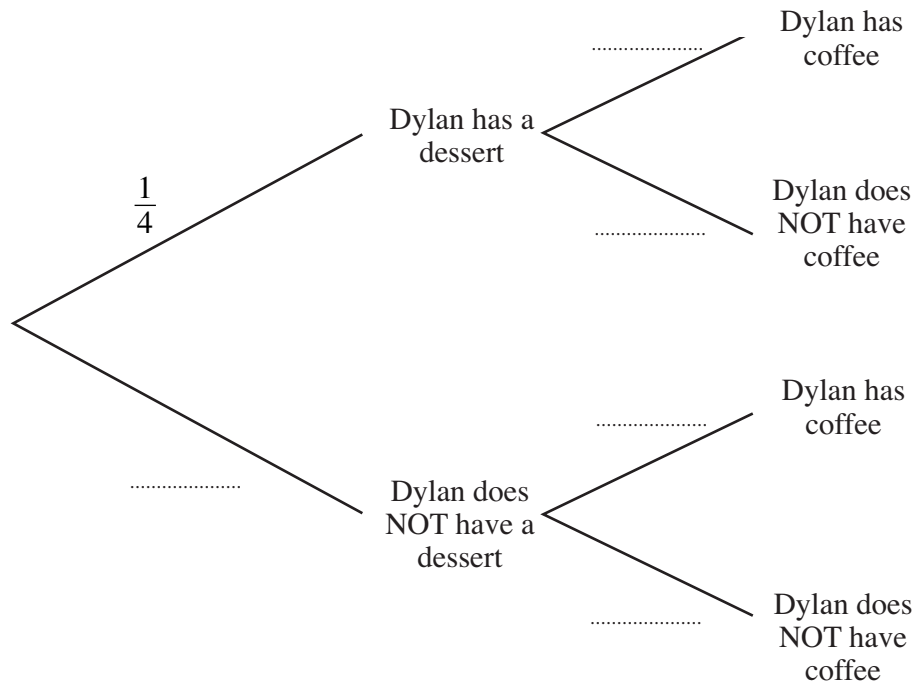
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[1]

12. When Dylan has lunch the probability that he has a dessert is $\frac{1}{4}$. Whether or not he has a dessert the probability that he has coffee is $\frac{2}{5}$.

(a) Complete the following tree diagram.



[2]

(b) Calculate the probability that Dylan has a dessert or coffee, but not both.

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[2]

13. A bag contains 16 red beads, 4 green beads and 1 yellow bead. Two beads are drawn at random without replacement from the bag.

(a) Calculate the probability that the two beads are of the same colour.

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[3]

(b) Calculate the probability that one of the two beads selected is yellow.

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[2]

14. (a) Simplify $\frac{x^2 + 5x + 6}{3x + 6}$.

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[3]

(b) Simplify $(3ab^7)^3$.

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[2]

(c) Make d the subject of the following formula.

$$\frac{de - c}{2d + g} = 5$$

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[4]

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15. (a)

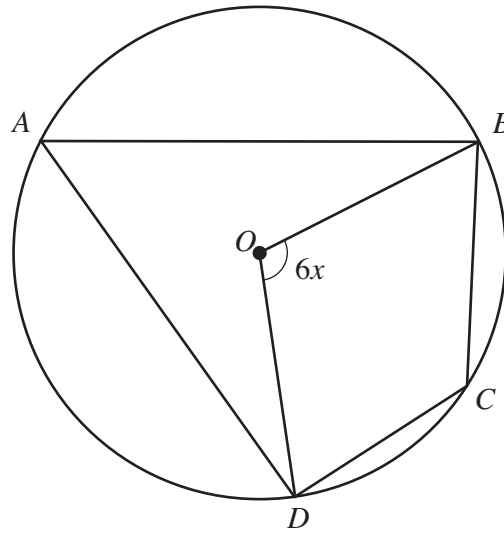


Diagram not drawn to scale.

The points A , B , C and D are on the circumference of a circle with centre O and $\widehat{BOD} = 6x$.
Find the size of \widehat{BCD} in terms of x .

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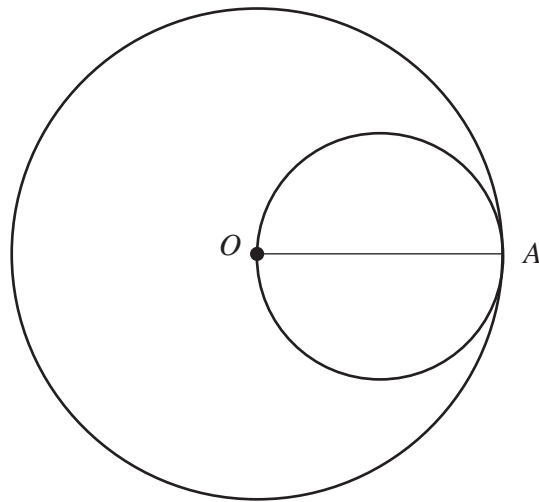
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[2]

(b)



The diagram shows two circles. The line OA is a radius of the larger circle and a diameter of the smaller circle. Find, in its simplest form, the area of the smaller circle as a fraction of the area of the larger circle.

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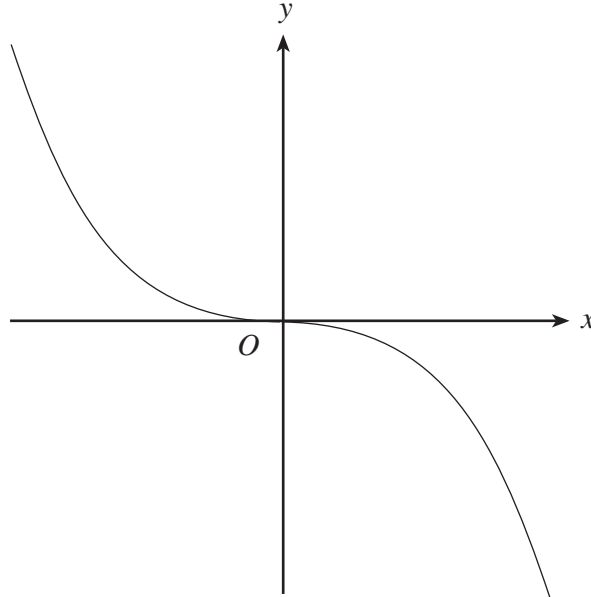
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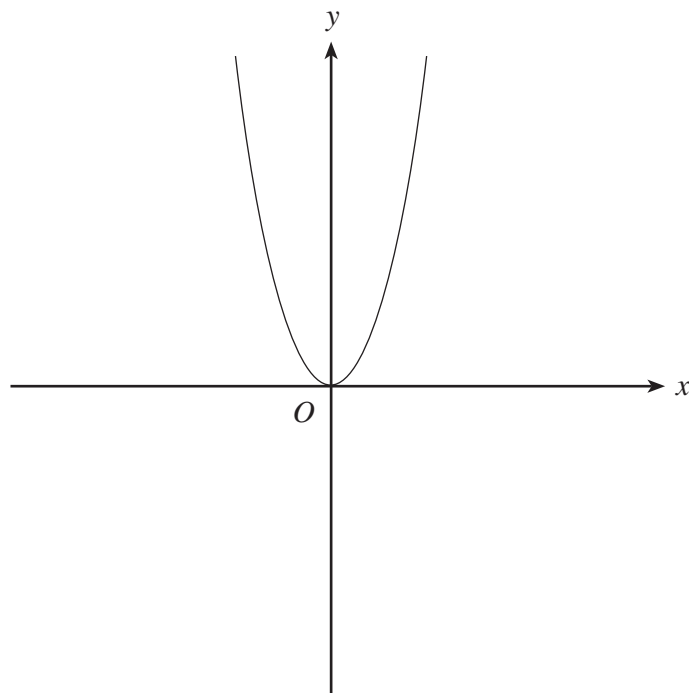
16. (a) The diagram shows a sketch of $y = -x^3$.
On the same diagram, sketch the curve $y = -2x^3$.

[1]



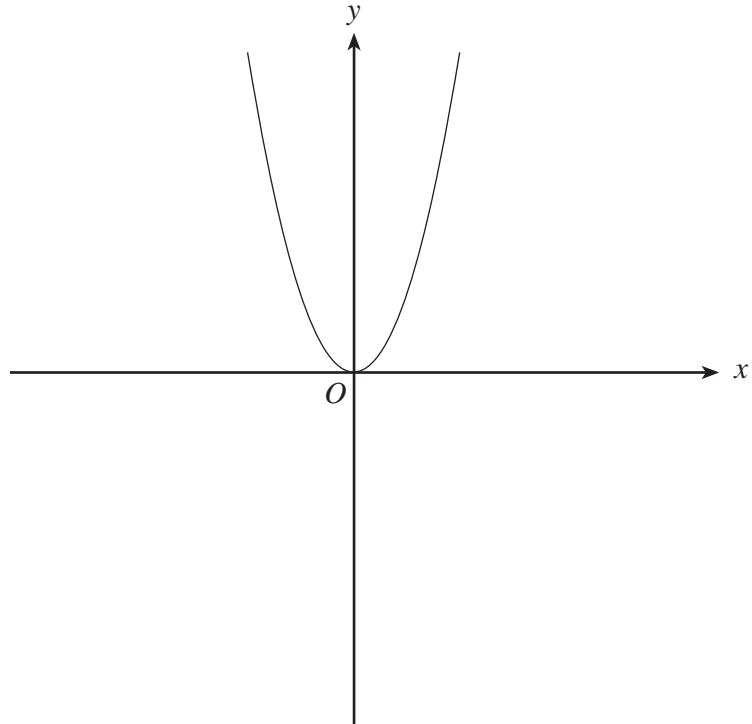
- (b) The diagram shows a sketch of $y = f(x)$.
On the same diagram, sketch the curve $y = f(x + 5)$.
Indicate the coordinates of one point on the curve.

[2]



- (c) The diagram shows a sketch of $y = f(x)$.
On the same diagram, sketch the curve $y = f(x) - 3$.
Indicate the coordinates of one point on the curve.

[2]



17. Solve $\frac{20}{n+1} + \frac{5n}{n+3} = 6$.

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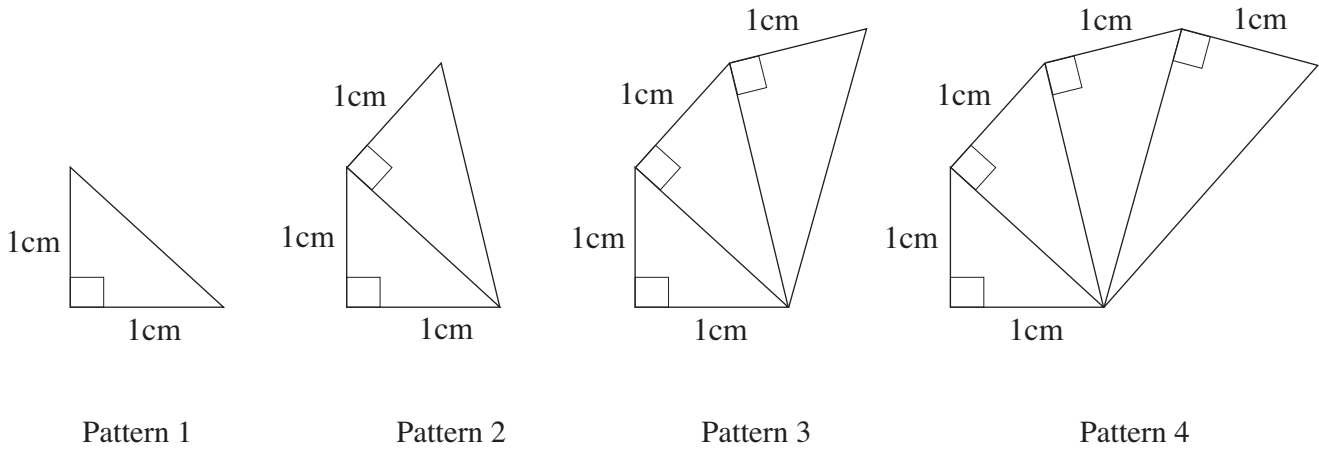
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[7]

18. Patterns are generated as shown in the diagram.



Diagrams not drawn to scale.

Find the perimeter of Pattern 6 in the form $a + \sqrt{b}$, where a and b are whole numbers. Show your working.

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[4]

Candidate Name	Centre Number	Candidate Number
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GCSE
MATHEMATICS - LINEAR
SPECIMEN PAPER
HIGHER TIER
PAPER 2 (Calculator)

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.

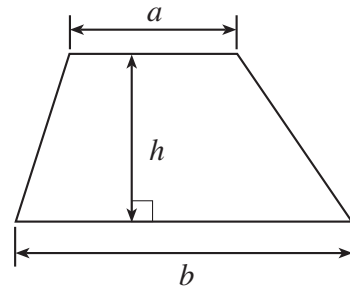
The number of marks is given in brackets at the end of each question or part-question.

You are reminded that assessment will take into account the quality of written communication (including mathematical communication) used in your answer to question 9.

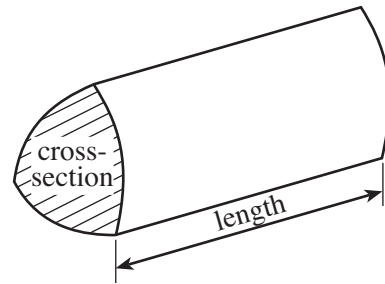
For Examiner's use only		
Question	Maximum Mark	Mark Awarded
1	4	
2	7	
3	6	
4	4	
5	5	
6	6	
7	3	
8	7	
9	7	
10	4	
11	9	
12	4	
13	4	
14	8	
15	3	
16	6	
17	5	
18	8	
TOTAL MARK		

Formula List

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

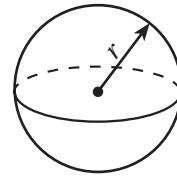


Volume of prism = area of cross-section \times length



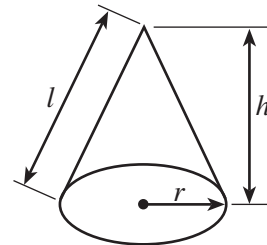
Volume of sphere = $\frac{4}{3} \pi r^3$

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



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

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

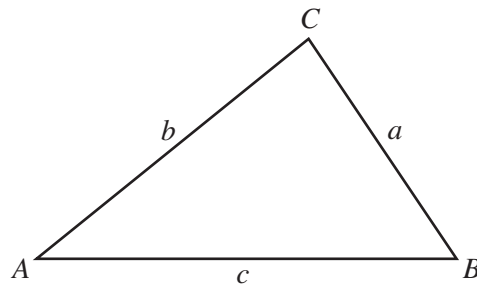


In any triangle ABC

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



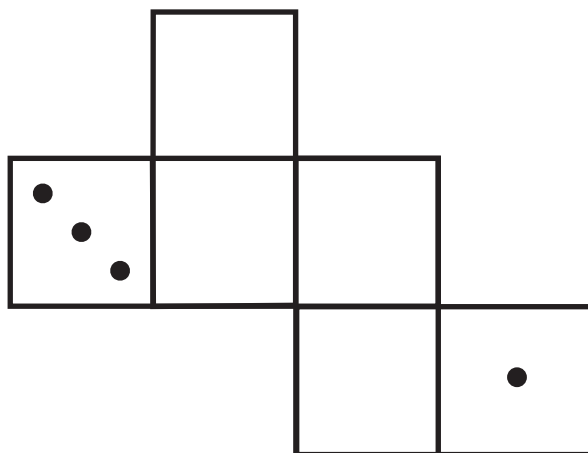
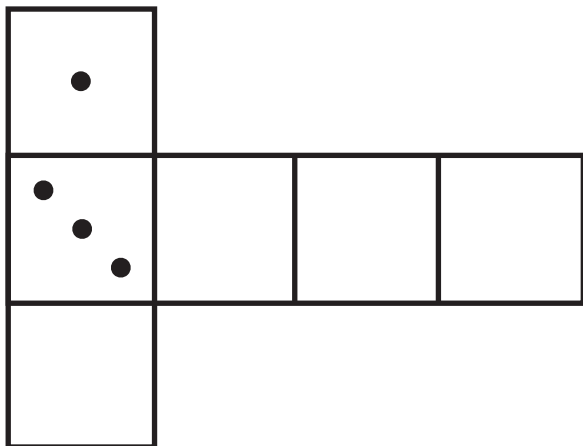
The Quadratic Equation

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. The numbers on opposite faces of a dice add up to 7.
Complete the following diagrams for nets of dice.



[4]

2. The owner of a takeaway coffee shop uses two types of paper cups.

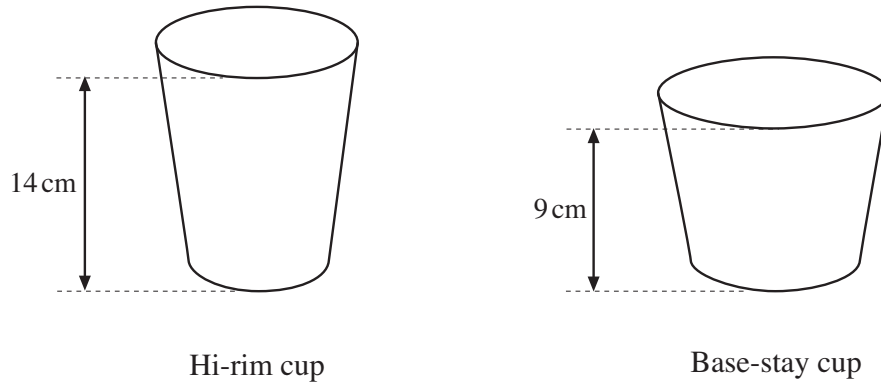


Diagram not drawn to scale.

A diagram of how the cups are stacked is shown below.

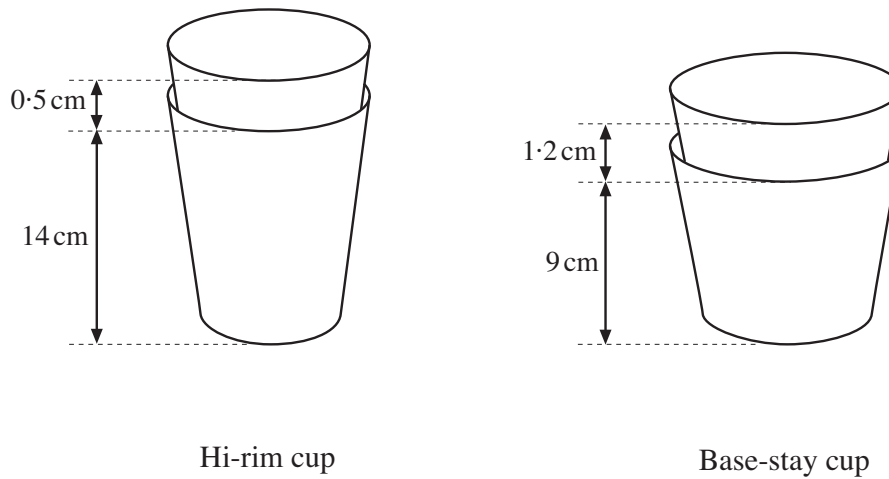


Diagram not drawn to scale.

(a) How high is a stack of 25 Hi-rim cups?

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.....

.....

[2]

(b) A stack of Base-stay cups is 18.6 cm high.
How many Base-stay cups are there in the stack?

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[2]

(c) A stack of Hi-rim cups is the same height as a stack of Base-stay cups.
There are 21 Base-stay cups in the stack.
How many cups are there in the stack of Hi-rim cups?

.....

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.....

[3]

3. Mrs Evans received an electricity bill from Wales Electricity Company. The bill, with some of the entries removed, is shown below.

Use the information given on the bill to complete **all** of the missing entries and calculate the total amount that Mrs Evans has to pay.

Wales Electricity Company		<i>Bill period 31st July 2009 to 30th November 2009</i>			
Mrs Evans 34 Beach Road Aber AB34 7JG					
INVOICE					
Meter reading last time	Meter reading this time	Tariff C-Customer reading E-Estimated reading	Units used	Price of each unit in pence	Amount £
47645C	48745C	Units used	.....	14.2	.....
		Quarterly charge			34.88
		Total charge before V.A.T.			.....
		V.A.T. at 5% of the total charge			.....
		Total charge including V.A.T.			.....
		Previous balance carried forward. Credit (CR)			12.00 (CR)
		Amount to pay		

Working

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[6]

4. The table below shows the probabilities of selecting one ball at random from a bag of coloured balls.

Colour	Red	Black	Yellow	White	Purple
Probability	0.25	0.14	0.06	0.15	0.40

- (a) Are there any balls of another colour in the bag? Give a reason for your answer.

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[2]

- (b) What is the probability of selecting either a yellow or a purple ball?

.....

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[2]

5. (a) Write down the first three terms of the sequence with an n th term of $n^2 + 10$.

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[2]

- (b) Solve $8x + 7 = 2x + 10$.

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[3]

6. (a) Express 104 as a percentage of 260.

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[2]

- (b) Calculate $\frac{5.6 \times 3.4}{8.1 - 2.7}$ giving your answer correct to two decimal places.

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[2]

- (c) Two friends share £280 in the ratio 3 : 4. Find how much **each** friend receives.

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[2]

7. The test scores of 20 people were recorded and the results are summarised in the following table.

Test score	Frequency
0 – 9	7
10 – 19	11
20 – 29	2

Calculate an estimate for the mean of the test scores.

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[3]

8. The table shows some of the values of $y = 2x^2 - 5$ for values of x from -2 to 2 .

(a) Complete the table by finding the value of y for $x = -2$ and $x = 1$.

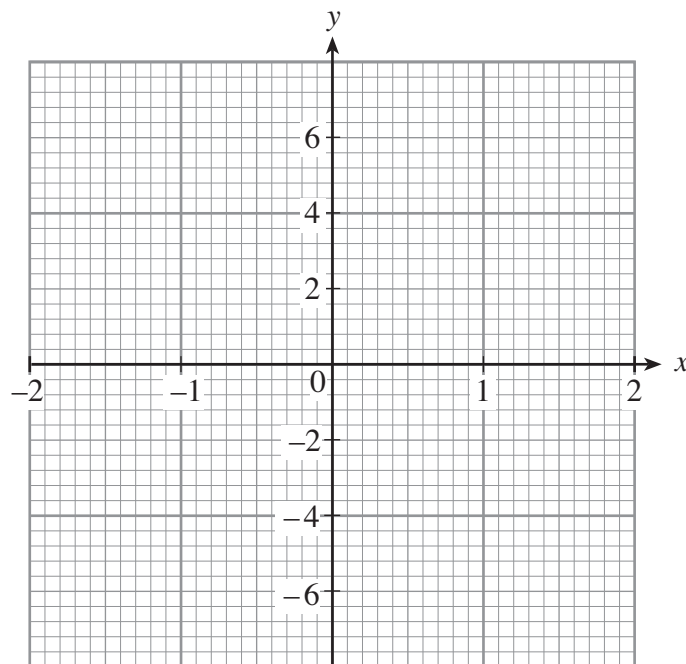
x	-2	-1	0	1	2
$y = 2x^2 - 5$		-3	-5		3

.....

 [2]

(b) On the graph paper below, draw the graph of $y = 2x^2 - 5$ for values of x between -2 and 2 .

[2]



(c) Write down the x -coordinates of the points of intersection of $y = 2x^2 - 5$ with the x -axis.

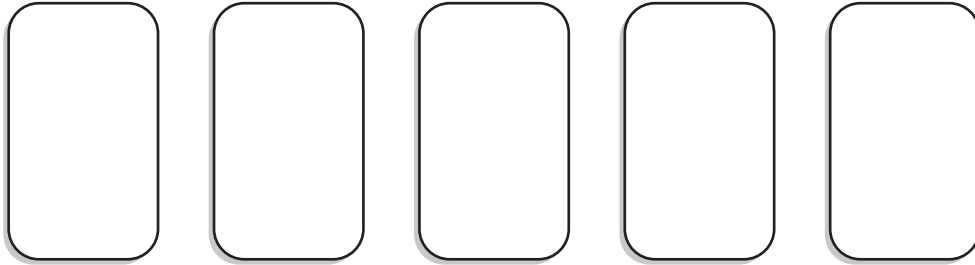
.....

 [2]

(d) Write down the minimum value of y .

..... [1]

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



A number is written on each of five cards.
The cards are arranged in ascending order.
It is known that the mean of the five numbers is 9.6, the range is 12, the median is 10, the largest number is 16 and the fourth number is twice the second number.
Explaining your reasoning, find the five numbers written on the cards.

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[7]

10. The diagram shows a cuboid.

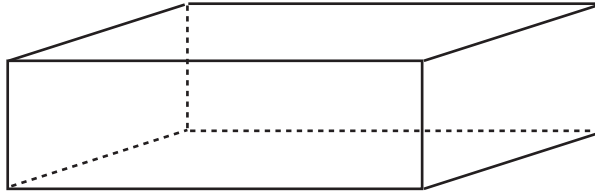


Diagram not drawn to scale.

The lengths of all the edges of the cuboid are increased by 20%. Find the percentage increase in the volume of the cuboid.

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[4]

11. The diagram below shows an ornamental archway, which is 8 m wide, 6.5 m high and 2 m deep, over a cycle path. The arch has a semi-circular cross-section with diameter 5 m. Given that one tin of paint is sufficient to cover a surface of area 5 m^2 , find the number of tins of paint needed to paint all the surfaces of the archway.

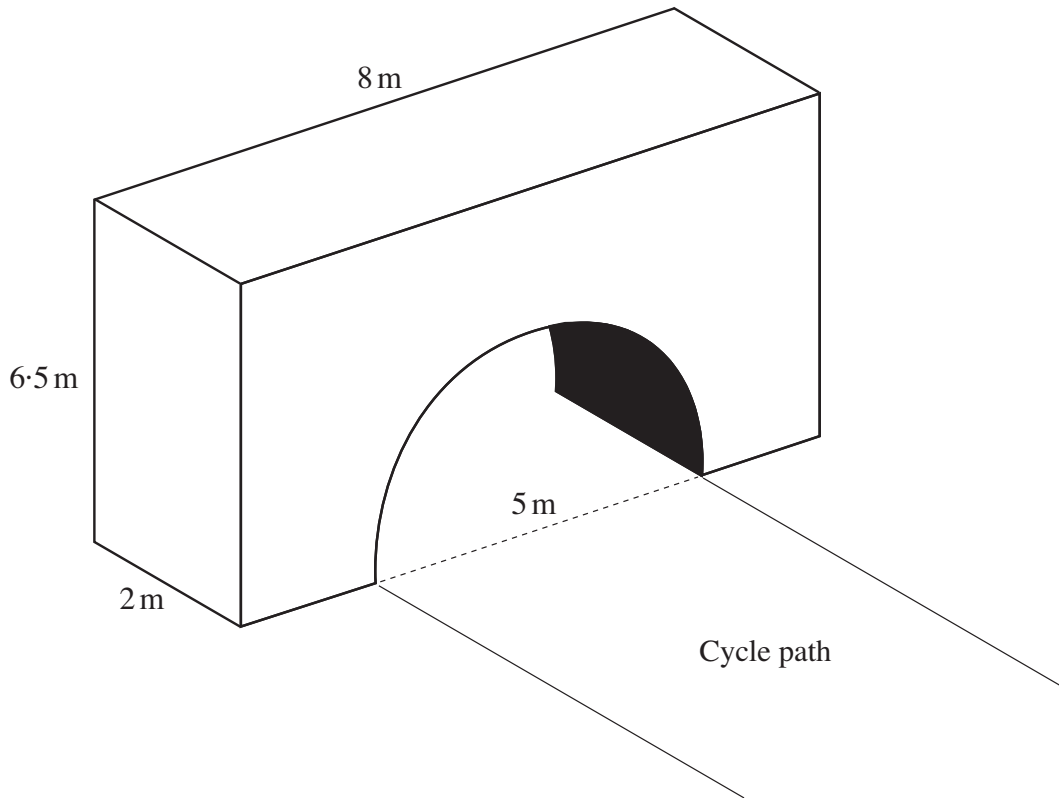


Diagram not drawn to scale.

12. The dimensions of a rectangle are:

Length $(x + 5)$ cm

Width $(x - 2)$ cm

The area of the rectangle is 120 cm^2 .
Find the value of x .

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[4]

13. On the graph paper below, draw the region which satisfies **all** of the following inequalities.

$$\begin{aligned}y &\leq x + 7 \\y &\geq 1 - 2x \\y &\geq 3 \\x &\leq 4\end{aligned}$$

Make sure that you clearly indicate the region that represents your answer.

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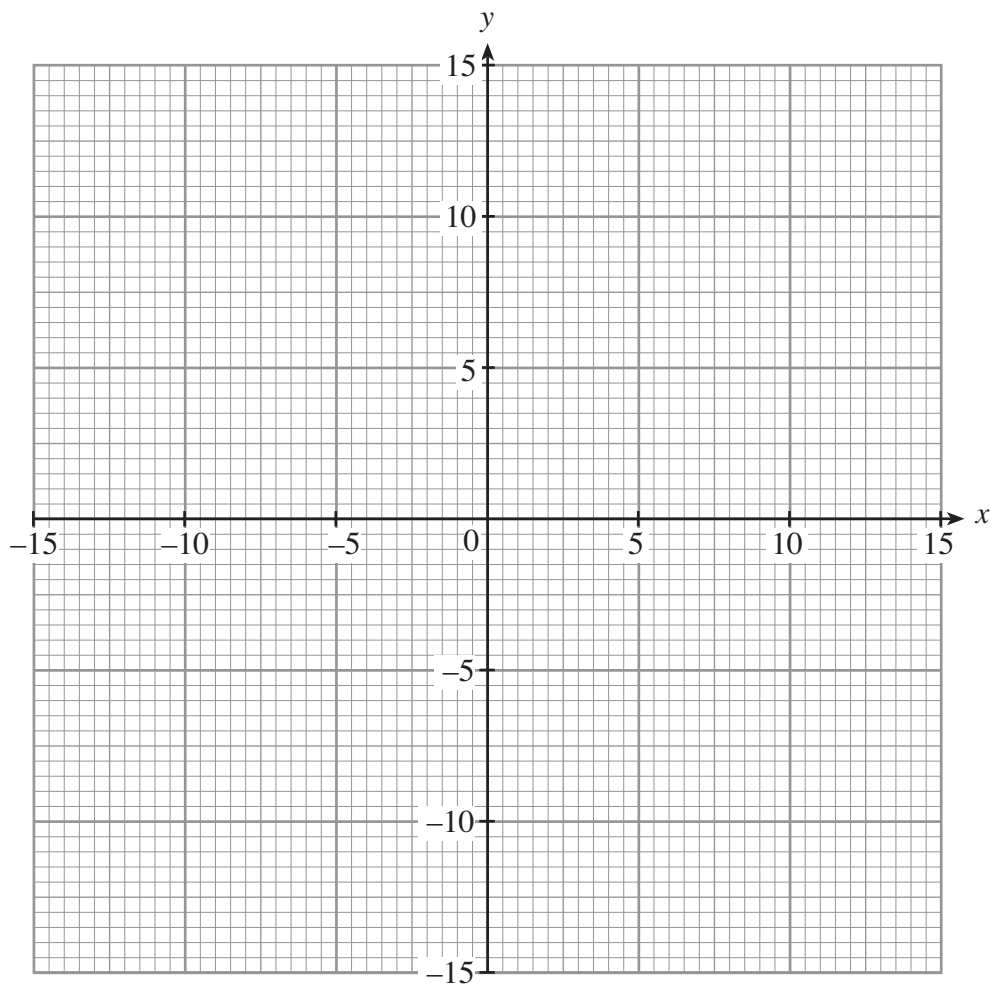
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[4]



14. (a) Factorise $6x^2 + 18xy$.

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

(b) Factorise $x^2 - 25$.

..... [1]

(c) Solve $4n - 5 < n + 22$.

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..... [2]

(d) Solve the equation $3x^2 + 19x + 11 = 0$, giving your solutions correct to two decimal places.

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..... [3]

15. There are 100 pupils in Year 10. The time taken by each pupil to answer a question was recorded. 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 pupils	6	19	25	36	14

- (a) Find an estimate for the median of this distribution.

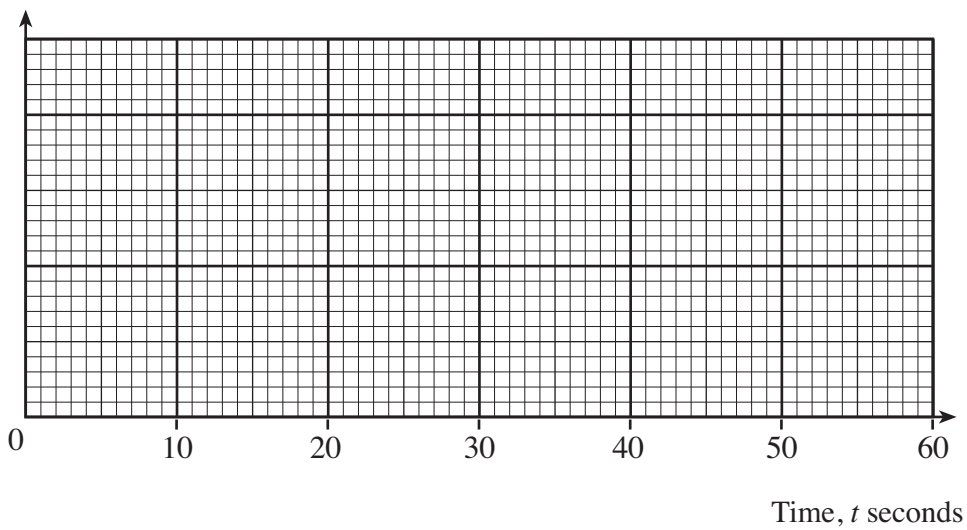
..... [1]

- (b) Draw a histogram to illustrate the distribution on the graph paper below.

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 [2]

Time taken to answer in seconds



16. The diagram shows a frustum of a cone.

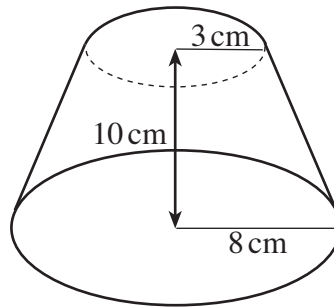


Diagram not drawn to scale.

The height of the frustum is 10 cm, the radius of the base is 8 cm and the radius of the top is 3 cm. Find the volume of the frustum.

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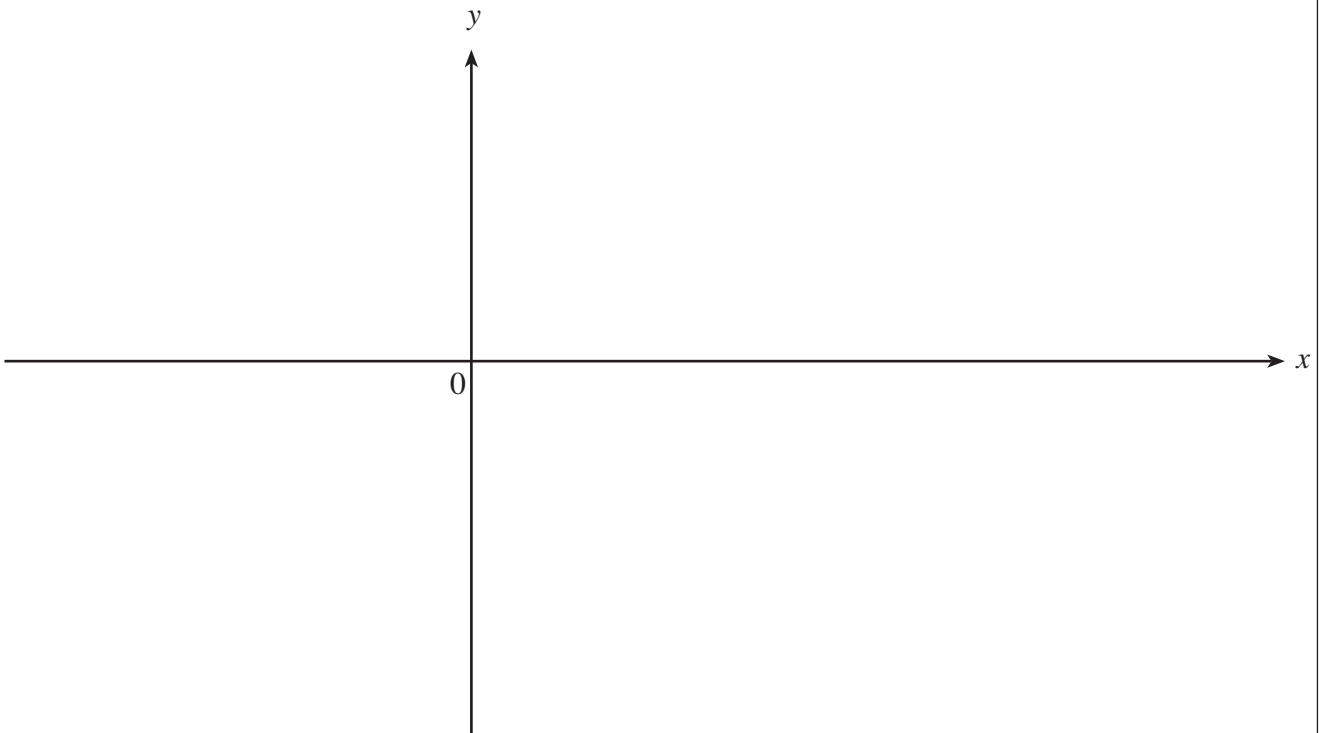
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[6]

17. (a) Using the axes below, sketch the graph of $y = \sin x$ for values of x from -180° to 360° . [2]



- (b) Find **all** solutions of the following equation in the range -180° to 360° .

$$\sin x = -0.788$$

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[3]

MARK SCHEMES

MARKING GUIDELINES

Types of Mark

'M' marks are awarded for any correct method applied appropriately, even though a numerical or computational error may be involved. Once M marks are earned they cannot be lost.

'm' marks are dependent method marks.

'A' marks are given for a numerically or computationally correct stage, for a correct result or for an answer lying within a specified range. They are only given if the relevant M/m mark has been earned either explicitly or by inference from the correct answer.

'B' marks are independent of method and are usually awarded for an accurate result or statement.

In graph, drawing or other questions, some marks may carry an identification letter (e.g. P1 for plotting points, C1 for drawing a curve, E1 for a correct explanation, S1 for correct strategy).

'QWC' marks will be awarded in questions assessing the quality of written communication.

Abbreviations

The following abbreviations may be used in mark schemes.

- C.A.O. = correct answer only
- SC = special case
- F.T. = follow through
- o.e. = or equivalent
- I.S.W. = ignore subsequent work
- QWC = quality of written communication

MARK SCHEME

FOUNDATION TIER – PAPER 1 (NON-CALCULATOR)

Question	Marks	Comments	(Page 2)
6. (a) (i) 34 (ii) 36 (b) 8 (c) 9g (d) 20 (e) $y = x + 3$	B1 B1 B2 B1 B2 B2 9	C.A.O. C.A.O. B1 for 40 OR ‘their 40’ $\div 5$ C.A.O. B1 for either 12 or 8 B1 for words such as ‘add 3’, which shows the connection between x and y .	
7. (a) Plots Line (b) Any correct strategy, e.g. 20 times value at 10 acres 78 – 82	P1 L1 M1 A1 4	Allow ONE error within a small square. Any correct method using graph or table. F.T. their graph. Unsupported answers in the range 78 – 82 get M1, A1.	
8. Lunches 20×45 = 900 Water 52×18 OR Crates $900 \div 18$ $\begin{array}{r} 52 \\ \times 18 \\ \hline 416 \\ \underline{520} \\ 936 \end{array}$ 936 OR 50 Yes (there is enough water OR he has 52 crates, so he has enough water)	M1 A1 M1 m1 A1 E1 6	For realising that 20×45 is needed For realising that 52×18 or $900 \div 18$ is needed Any complete correct method e.g. $10 \times 18 = 180$ $50 \times 18 = 900$ $2 \times 18 = 36 \dots\dots\dots 900 + 36 =$ F.T. conclusion on their figures if at least M1 awarded.	
9. (a) $\begin{array}{ccc} 6 & 9 & 12 \\ 6 & 9 & 10 \end{array}$ (b) Sight of $\frac{7}{16}$ (may be implied from later work) $\frac{7}{16}$ of 80 = 35 $80 \times 50p - 35 \times (\pounds)1$ OR $\pounds 40 - 35$ = $\pounds 5.00$ OR 500p	B2 B2 M1 A1 M1 A1 8	C.A.O. B1 for any 1 correct row or any 2 correct columns F.T. their table B1 for a numerator of 7 in a fraction less than 1. B1 for a denominator of 16 in a fraction less than 1 F.T. ‘their (b)’ if a fraction less than 1 ($\neq \frac{1}{2}$) For multiplication and subtraction F.T. ‘their 35’	<u>NOTES</u> Penalise –1 once only for use of words such as “7 out of 16”, “7 in 16” OR “7:16”. When a fraction and incorrect notation are used for the same answer, DO NOT penalise incorrect notation.

MARK SCHEME

FOUNDATION TIER – PAPER 1 (NON-CALCULATOR)

Question	Marks	Comments (Page 3)
10. (a) 13 (miles) (b) 36 (minutes) (c) By the steepness (gradient) of the line(s) OR Before, because she took less time (d) 13:36	B1 B1 E1 B1 4	C.A.O. C.A.O. C.A.O.
11. For train. Choice of train 10:52 to 13:27 OR 09:27 to 12:27 Time taken = 2hrs 35min OR 3hrs Cost = (£)79 For bus Choice of bus 07:50 to 13:35 OR 07:15 to 11:55 Time taken = 5hrs 45min OR 4hrs 40min (Cost = £32) For car Time = $105 \div 35$ = 3hrs Cost = $2 \times 105 \times 30(p)$ = (£)63 or 6300p Valid advantage and disadvantage for one mode of transport.	M1 A1 B1 (M1) A1 B1 B1 E2 8	Award M1 for times from either train or bus timetable. Accept correct departure or arrival time. Accept correct departure or arrival time. Must refer to the same mode of transport. No credit or penalty if more than one mode of transport noted. E1 if only an advantage or disadvantage given. F.T. their values (must be seen) for times and costs. Valid advantages and disadvantages need not be restricted to time and cost.
12. (a) (i) $(x =) 18$ (ii) $7x = 21$ $x = 3$ (b) $-3a - 13b$	B1 B1 B1 B2 5	C.A.O. Accept embedded answers such as $18 \div 6=3$ Accept embedded answers such as $7 \times 3 =21$ F.T. 'their 21' B1 for $-3a$ OR $-13b$
13. (a) Correct enlargement Correct position (b) Correct rotation	B2 B1 B2 5	B1 for 2 points correct, or B1 for consistent but incorrect scale factor used. FT their consistent scale factor ($\neq 1$) B1 for 90° anticlockwise rotation about (1,2) OR for 90° clockwise rotation about (2,1) B1 for 4 correct triangles made by 4 rotations of 90°

MARK SCHEME

FOUNDATION TIER – PAPER 1 (NON-CALCULATOR)

Question	Marks	Comments (Page 4)
14. (a) Estimates, e.g. 500, 20, 4 = 2500 (b) $C = 2 \times 3 \cdot 14 \times 20$ = 125.6 (cm)	M1 A1 M1 A1 4	Accept correct calculations of their estimates within the range 2250 – 2750
15. (a) 97, 99, 101, (103), 105. 98, 100, 102, 104, 106 (b) Strategy: must be odd numbered Strategy: $65 \div 5$ or algebraic method 9, 11, 13, 15, 17 (c) 9 and 10	B1 B1 B1 B1 B1 5	Correctly placed e.g. $n + n + 2 + n + 4 + n + 6 + n + 8 = 65$; $5n = 45$; $n = 9$ B1 implies both strategy marks C.A.O.
16. Arc centre X , radius $D\bar{X} \pm 2\text{mm}$ (5cm) Arc centre corner of building, correct radius $\pm 2\text{mm}$ (3cm) Correct answer	B1 B1 B1 3	Arc length shows intention. Allow series of dots as arc. C.A.O. Intention not to go into the building
17. (a) (i) 6pm (ii) Between 12:30pm & 2pm UK, AND 8:30pm & 10pm HK (b) 4×80 OR 3×107 320 and 321 Hotel Bear and reason, e.g. 4 dinners for £1	B1 B2 M1 A1 E1 QWC2 8	Could be a shorter period within this time interval. B1 for either time period. OR E1 for Hotel Gelton and acceptable reason. FT provided they compare 'their 4×80 with their 3×107 ' 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 Presents material in a coherent and logical manner but with some errors in use of mathematical form, spelling, punctuation or grammar OR evident weaknesses in organisation of material but using acceptable mathematical form, with few if any errors in spelling, punctuation and grammar. QWC0 Evident weaknesses in organisation of material, and errors in use of mathematical form, spelling, punctuation and grammar.

ASSESSMENT GRID

MATHEMATICS – LINEAR

FOUNDATION TIER – PAPER 1 (NON-CALCULATOR)

Question	Assessment Objectives (Marks)			Total Mark	QWC	Functional Elements
	AO1 (45% - 55%)	AO2 (25% - 35%)	AO3 (15% - 25%)			
1	10			10		
2	3			3		
3	5			5		
4	2		6	8		
5	5			5		✓
6	5	4		9		
7	2	2		4		
8			6	6		✓
9	2	6		8		✓(b)
10	2	2		4		
11		8		8		✓
12	5			5		
13	5			5		
14	4			4		
15		5		5		
16		3		3		
17		1	7	8	✓	✓
Totals	50	31	19	100		33

MARK SCHEME

FOUNDATION TIER – PAPER 2 (CALCULATOR)

Question	Marks	Comments (Page 1)
1. (a) (i) 12.78 50.34 20.82 91.4(0) (ii) $\frac{5}{100} \times 91.4$ = 4.57 (ISW) (b) (i) 40 (%) (ii) 60 (%)	B1 B1 B1 B1 M1 A1 B1 B1 8	F.T. their figures for ONE error OR 10% = (£) 9.14 Any valid method for finding 5% F.T. ‘their 91.40’, but must be in money form truncated or rounded. F.T. 100 – ‘their (i)’
2. (a) (i) 340 (g) (ii) Pointer at 340 (b) 60 (m.p.h.)	B1 B1 B1 3	F.T. ‘their 340’
3. (a) Evidence of square counting 74 – 78 370 – 390 (b) chord diameter (c) trapezium pentagon cylinder	M1 A1 B1 B1 B1 B1 B1 B1 8	e.g. dots in the squares F.T. their area $\times 5$
4. (a) Cost = $3 \times 6.75 + 10$ = 3025 p OR (£) 30.25 (b) Number of days $\times 6.75 = (61 - 7)$ Number of days = 8	M1 A1 M1 A1 4	For correct substitution For correct substitution and subtraction Allow embedded references to the correct answer.
5. (a) A (-3, 4) B (-3, -2) (b) C marked at (-3, 1) (c) E marked at (-3, -1)	B1, B1 B1 B1 4	Reversed coordinates get B0 May be on the graph, but answer space takes precedence Marking the points on the graph paper takes precedence in (b) and (c)
6. (a) 14 cm ³ (b) (i) 51° to 55° (ii) angle XYZ = 122° to 126°	B1 U1 B1 B1 4	Independent of the ‘14’

MARK SCHEME

FOUNDATION TIER – PAPER 2 (CALCULATOR)

Question	Marks	Comments (Page 3)
12. (a) $\frac{1}{3}$ or equivalent fraction. (b) <u>You cannot tell from the pie charts</u> because you would need to know the number of Year 11 pupils and number of Year 12 pupils. OR <u>You can tell from the pie charts</u> if the number of pupils in Years 11 and 12 were equal.	B1 B2 3	Accept equivalent percentages or decimals. “We don’t know how many pupils in Year 11 (or Year 12)” gets B2 Their explanation takes precedence over their choice of Yes/No or if no choice is made.
13. (a) Correct image (-1, 3) (-5, 1) (-3, -2) (b) $\begin{pmatrix} -3 \\ 4 \end{pmatrix}$ OR 3 left and 4 up	B1 B1 2	
14. (a) AB = 15.5 (cm) Actual distance = 15.5×10 = 155 (km) (b) Ship from A travels 120km Ship from B travels 90km Arc of a circle centre A radius 12cm AND arc of a circle centre B radius 9cm <u>meeting at a point</u> . Cannot meet at the right hand intersection because the ship from B cannot cross land. Bearing from their chosen point.	B1 M1 A1 B1 B1 B2 E1 B1 9	Allow 15.3 – 15.7 F.T. their AB (if in the range 153 – 157) Or implied by their drawing OR implied. Or implied by their drawing. B1 only for either arc if they do not meet. Allow 11.8 – 12.2. F.T. their distance $\div 10$ Allow 8.8 – 9.2. F.T. their distance $\div 10$ The B2 is awarded for the correct position of their point where the ships meet being clearly & unambiguously marked even if no arcs are drawn. If due to error(s) candidates end up with 2 possible points of meeting, then E1 for stating that there are 2 places and B1 for finding BOTH bearings from position of their points where the ships meet. F.T. any bearing that is >180 .
15. (a) $14 + 24 \times 0.5$ = 26 (cm) (b) $(18.6 - 9) \div 1.2$ (=8) 9 (cups) (c) $9 + 20 \times 1.2$ (= 33 cm) $(33 - 14) \div 0.5$ 39 (cups)	M1 A1 B1 B1 B1 B1 B1 7	SC1 for 26.5(cm) An answer of 8 cups implies the first B1 F.T. for their “33”, e.g. $9 + \dots \times 1.2$ C.A.O. An answer of 38 cups implies the first and second B1 <i>Alternatively accept a trial & improvement method</i>

MARK SCHEME

FOUNDATION TIER – PAPER 2 (CALCULATOR)

Question	Marks	Comments	(Page 4)
16. (a) 18.29 (b) EITHER $\frac{28}{100} \times (\text{£})542$ AND subtracted from £542 (£) 151.76 (£) 390.24 OR $\frac{72 \times 542}{100}$ = (£) 390.24	B1 M1 B1 A1 OR M1 B1 A1 4	Complete method. Need to show a correct process for finding 28% AND subtracting it from (£) 542 For sight of (£) 151.76 F.T. their 28% if M1 awarded. Need to show a correct process for finding 72% of 542 For sight of the 72 OR (0)·72 C.A.O.	
17. (a) Attempt to add to check total is/is not 1 No, stating total probability is 1 (b) $0.06 + 0.4$ = 0.46	M1 A1 M1 A1 4	Accept exact equivalent % and/or fractions throughout question.	
18. $6x - 7 = 4x + 12$ $2x = 19$ $x = \frac{19}{2}$ ISW (= 9.5 OR $9\frac{1}{2}$)	B1 B1 B1 3	Clearing brackets correctly F.T. until second error Correctly collecting terms on both sides of the equation F.T. $ax = b$ ($a \neq 1$)	
19. Total is 48 (Range is 12 and greatest number is 16 \Rightarrow) least number is 4 10 is in middle box Use of $4^{\text{th}} = 2^{\text{nd}} \times 2$ 4, 6, 10, 12, 16	B1 B1 B1 B1 B1 QWC2	All 5 numbers correct and in ascending order 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 Presents material in a coherent and logical manner but with some errors in use of mathematical form, spelling, punctuation or grammar OR evident weaknesses in organisation of material but using acceptable mathematical form, with few if any errors in spelling, punctuation and grammar. QWC0 Evident weaknesses in organisation of material, and errors in use of mathematical form, spelling, punctuation and grammar.	
20. 2500.00 175.00 2675.00 187.25 OR 2862.25 $2500(1.07)^2$ M2 2862.25 A1	B1 M1 A1 3	For a correct 7%. For the overall method (2 stages of adding different 7%). C.A.O. Ignore subsequent working. SC1 for (£)2850 (simple interest), alternatively they may get the B1 for (£)175 if seen.	

ASSESSMENT GRID**MATHEMATICS – LINEAR****FOUNDATION TIER – PAPER 2 (CALCULATOR)**

Question	Assessment Objectives (Marks)			Total Mark	QWC	Functional Elements
	AO1 (45% - 55%)	AO2 (25% - 35%)	AO3 (15% - 25%)			
1	8			8		✓
2	3			3		✓
3	8			8		
4	4			4		
5	4			4		
6	4			4		
7		6		6		
8		4		4		
9	6			6		
10		6		6		✓
11		5		5		
12	3			3		
13	2			2		
14	3		6	9		✓
15		4	3	7		✓
16	4			4		
17		2	2	4		
18	3			3		
19			7	7	✓	
20	3			3		
Totals	55	27	18	100		33

MARK SCHEME

HIGHER TIER – PAPER 1 (NON-CALCULATOR)

Question	Marks	Comments (Page 1)
1. (a) 2:2 (b) 2.2×15 $\times 10$ 330 (litres) (c) $25 \times 1.5/100$ $= 0.375$ (kg) 0.375×1000 $= 375$ (g)	B1 M1 M1 A1 M1 A1 M1 A1 8	F.T. their (a) F.T. their amount in kg. Award for multiplication by 1000 at any stage.
2. $x = 35^\circ$ $y = 35^\circ$ $z = 145^\circ$	B1 B1 B1 3	F.T. $y = x$
3. (a) All points plotted correctly (b) Positive (c) Use of line of best fit Percentage cloud from their line of best fit	B2 B1 M1 A1 5	B1 for at least 3 correct plots, or B1 if coordinates reversed. Ignore line of best fit, <i>Penalise joined point to point -1.</i> <i>Do not accept descriptions.</i>
4. $\frac{1}{2} \times 11 \times 7$ $= 38.5$ cm^2	M1 A1 U1 3	Attempt $\frac{1}{2}$ base \times height seen, e.g. 5.5×7 Award only if 7×11 implied, irrespective of halving
5. (a) Correct enlargement Correct position (b) Correct rotation	B2 B1 B2 5	B1 for 2 points correct, or B1 for consistent but incorrect scale factor used. F.T. their consistent scale factor. ($\neq 1$) B1 for 90° anticlockwise rotation about (1,2) OR for 90° clockwise rotation about (2,1) B1 for 4 correct triangles made by 4 rotations of 90°

Question	Marks	Comments (Page 2)
<p>6. (a) (i) 6pm</p> <p>(ii) Between 12:30pm & 2pm UK, AND 8:30pm & 10pm HK</p> <p>(b) 4×80 OR 3×107 320 and 321</p> <p>Hotel Bear and reason, e.g. 4 dinners for £1</p> <p>(c) (i) $400 \times 15 (= 6000)$ $400 \times 15 - 1500$ $= 4500$ (\$)</p> <p>(ii) Less with reason, e.g. $1500 \div 17 < 100$ or $100 \times 17 > 1500$</p>	<p>B1</p> <p>B2</p> <p>M1 A1</p> <p>E1</p> <p>QWC2</p> <p>M1 M1 A1 E2</p> <p>13</p>	<p>Could be a shorter period within this time interval. B1 for either time period.</p> <p>OR E1 for Hotel Gelton and acceptable reason. FT provided they compare 'their 4×80 with their 3×107'</p> <p>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 Presents material in a coherent and logical manner but with some errors in use of mathematical form, spelling, punctuation or grammar OR evident weaknesses in organisation of material but using acceptable mathematical form, with few if any errors in spelling, punctuation and grammar. QWC0 Evident weaknesses in organisation of material, and errors in use of mathematical form, spelling, punctuation and grammar.</p> <p>OR $1500 \div 15 (=100)$ OR $\{400 - 100\} \times 15$</p> <p>E1 for Less with no or incorrect reason</p>
<p>7.(a) 97, 99, 101, (103), 105 & 98, 100, 102, 104, 106</p> <p>(b) Strategy: must be odd numbered Strategy: $65 \div 5$ or algebraic method 9, 11, 13, 15, 17</p> <p>(c) Strategy: two consecutive numbers multiply to give to 380 19 and 20</p>	<p>B1</p> <p>B1</p> <p>B1</p> <p>B1</p> <p>B1</p> <p>B1</p> <p>6</p>	<p>Correctly placed</p> <p>e.g. $n + n + 2 + n + 4 + n + 6 + n + 8 = 65$; $5n = 45$; $n = 9$ B1 implies both strategy marks</p> <p>Or product of their numbers is 380, e.g. 10 & 38</p>
<p>8. Arc centre X, radius $DX \pm 2\text{mm}$ Arc centre corner of building, correct radius $\pm 2\text{mm}$ Correct answer</p>	<p>B1</p> <p>B1</p> <p>B1</p> <p>3</p>	<p>Arc length shows intention. Allow series of dots as arc.</p> <p>C.A.O. Intention not to go into the building.</p>
<p>9. (a) $4y^4 + y$ (b) t^4</p>	<p>B2</p> <p>B1</p> <p>3</p>	<p>I.S.W. B1 for each term.</p>

MARK SCHEME

HIGHER TIER – PAPER 1 (NON-CALCULATOR)

Question	Marks	Comments (Page 3)
<p>10. (a) (i) Polygon with at least two vertices correct (horizontal & vertical) All 4 vertices at correct positions</p> <p>(ii) $10 < t \leq 20$</p> <p>(b) Interquartile range = ... - ... 8</p> <p>(c) Yes with a correct explanation referring to the estimate of the median of the second class and the group containing the median for the first class.</p>	<p>M1</p> <p>A1</p> <p>B1</p> <p>M1</p> <p>A1</p> <p>B2</p> <p>7</p>	<p>Ignore bars. Accept the intention of straight lines drawn without a ruler.</p> <p>Ignore starting at 0 and right hand end.</p> <p>SC1 for a correct polygon or curve using all 4 vertices but translated horizontally, or SC1 for all vertices plotted correctly but no polygon or points joined with a curve.</p> <p>Accept any indication “10 to 20”, but not a single value.</p> <p>Allow M1 for correct intention but with incorrect reading of time scale. (8 gives 11.5, 24 gives 19.5.)</p> <p>Accept answers in range $7 \leq x \leq 9$.</p> <p>B1 for Yes, explanation refers only to the estimate of the median of the second class</p>
<p>11. (a) $V = \frac{1}{3} \times 18 \times x$</p> <p>(b) $V = 10x^2$</p> <p>(c) Table completed correctly 5 correct points plotted correctly All correct points joined with a curve</p> <p>(d) Equal volume</p>	<p>B1</p> <p>B1</p> <p>B1</p> <p>B1</p> <p>B1</p> <p>E1</p> <p>6</p>	<p>Accept $V = 10 \times x \times x$</p> <p>F.T. their $V = 10x^2$ provided that it is not linear</p> <p>F.T. their points (0,0), (0.2,0.4), (0.4,1.6), (0.6,3.6), (0.8,6.4), (1, 10)</p>
<p>12. (a) $\frac{3}{4}$</p> <p>$\frac{2}{5}, \frac{3}{5}, \frac{2}{5}, \frac{3}{5}$</p> <p>(b) $\frac{1}{4} \times \frac{3}{5} + \frac{3}{4} \times \frac{2}{5}$ $= \frac{9}{20}$</p>	<p>B1</p> <p>B1</p> <p>M1</p> <p>A1</p> <p>4</p>	<p>On correct branch</p> <p>On correct branches, or on one pair with other blank</p> <p>FT their probabilities, not all $\frac{1}{2}$, not 0 or 1</p>

MARK SCHEME

HIGHER TIER – PAPER 1 (NON-CALCULATOR)

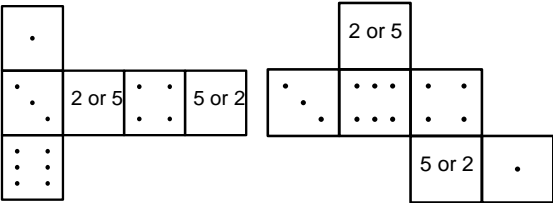
Question	Marks	Comments (Page 4)
13. (a) $P(RR) = \frac{16}{21} \times \frac{15}{20}$ or $P(GG) = \frac{4}{21} \times \frac{3}{20}$ $P(\text{same colour}) = \frac{16}{21} \times \frac{15}{20} + \frac{4}{21} \times \frac{3}{20}$ $= \frac{252}{420}$ (b) $P(Y'Y') + P(Y'Y) (= \frac{1}{21} \times \frac{20}{20} + \frac{20}{21} \times \frac{1}{20})$ $= \frac{40}{420}$	B1 M1 A1 M1 A1 5	Accept including P(Y'Y) Accept including P(Y'Y) Accept equivalent fraction, e.g. $\frac{3}{5}$ Or other complete method Accept equivalent fraction, e.g. $\frac{2}{21}$ Ignore incorrect cancelling of final answers.
14. (a) $\frac{(x+3)(x+2)}{3(x+2)}$ $\frac{x+3}{3}$ (b) $27a^3b^{21}$ (c) $de - c = 5(2d + g)$ $de - c = 10d + 5g$ $de - 10d = 5g + c$ $d(e - 10) = 5g + c$ $d = \frac{5g + c}{e - 10}$	B1 B1 B1 B2 B1 B1 B1 B1 9	Mark final answer, further incorrect working penalised B1 for $27a^3b^{21}$ or $27a^{21}b^{21}$ or $\dots a^3b^{21}$ <i>F.T. until 2nd error.</i> Award B0 for further incorrect working.
15. (a) $180 - 3x$ (b) πx^2 and $\pi(2x)^2$ taking $OA=2x$ or equivalent $\frac{1}{4}$	B2 M1 A1 4	Accept $180 - \frac{6x}{2}$. B1 appropriate sight of $\frac{6x}{2}$ or $3x$. B0 for $180 - 6x$. If B2 penalise extra incorrect work -1 Brackets essential. Sight of 4 or 2^2 or $(\frac{1}{2})^2$
16. (a) Steeper (b) Translation to the left Clearly touches $(-5, 0)$ (c) Vertical translation -3 indicated on the y -axis	B1 B1 B1 B1 B1 5	Allow SC1 for right shift with 5 indicated. Up or down
17. $20(n+3) + 5n(n+1)$ Common denominator or multiplier $(n+1)(n+3)$ $20n + 60 + 5n^2 + 5n$ $= 6(n^2 + 4n + 3)$ $n^2 - n - 42 = 0$ $(n-7)(n+6) = 0$ $n = 7$ or $n = -6$	M1 M1 M1 M1 A1 M1 A1 7	F.T. their LHS for equivalent level of difficulty F.T. their RHS for equivalent level of difficulty F.T. equivalent level of difficulty Factorising or substitution into formula F.T. to solution containing 1 term under $\sqrt{\quad}$
18. Strategy, repeated use of Pythagoras' theorem. Any two correct hypotenuses. Perimeter Pattern 6 is $7 + \sqrt{7}$ (cm)	M1 B2 A1 4	e.g. for patterns 1 & 2 B1 for any correct hypotenuse ($\sqrt{2}$ or $\sqrt{3}$ or $\sqrt{4}$ or $\sqrt{5}$ etc) C.A.O. B marks are implied if A1 awarded. Correct answer, no workings, award all 4 marks.

ASSESSMENT GRID**MATHEMATICS – LINEAR****HIGHER TIER – PAPER 1 (NON-CALCULATOR)**

	Assessment Objectives (Marks)			Total Mark	QWC	Functional Elements
	AO1 (45% - 55%)	AO2 (25% - 35%)	AO3 (15% - 25%)			
Question						
1	1	7		8		✓
2	3			3		
3	3	2		5		
4	3			3		
5	5			5		
6		6	7	13	✓	✓
7		6		6		
8		3		3		
9	3			3		
10	5		2	7		
11		5	1	6		
12	4			4		
13	5			5		
14	9			9		
15	2		2	4		
16	5			5		
17	7			7		
18			4	4		
Totals	55	29	16	100		21

MARK SCHEME

HIGHER TIER – PAPER 2 (CALCULATOR)

Question	Marks	Comments (Page 1)
<p>1.</p> 	<p>B2 B2 4</p>	<p>First net (dots or numbers) B1 for one pair of opposite sides completed correctly</p> <p>Second net (dots or numbers) B1 for one pair of opposite sides completed correctly</p> <p><i>Orientation of the dots or numbers does not matter!</i></p>
<p>2. (a) $14 + 24 \times 0.5$ $= 26$ (cm) (b) $(18.6 - 9) \div 1.2$ (= 8) 9 (cups) (c) $9 + 20 \times 1.2$ (= 33 cm) $(33 - 14) \div 0.5$ 39 (cups)</p>	<p>M1 A1 B1 B1 B1 B1 B1 7</p>	<p>SC1 for 26.5(cm)</p> <p>An answer of 8 cups implies the first B1</p> <p>FT for their “33”, e.g. $9 + \dots \times 1.2$ C.A.O. An answer of 38 cups implies the first and second B1 <i>Alternatively accept a trial & improvement method</i></p>
<p>3. Units used 1100 Units used $\times 14.2 \div 100$ (= 156.2(0)) $5 \div 100 \times (156.2(0) + 34.88)$ VAT £ 9.55(4) Total charge £ 200.63(4) Amount to pay £ 188.63(4)</p>	<p>B1 B1 B1 B1 B1 B1 6</p>	<p><i>FT each step independently</i> FT FT their 156.20, accept other methods to find 5% FT FT FT their total charge – £12</p>
<p>4. (a) Attempt to add to check total is/is not 1 No, showing total probability is 1 (b) $0.06 + 0.4$ $= 0.46$</p>	<p>M1 A1 M1 A1 4</p>	
<p>5. (a) 11, 14, 19 (b) $8x - 2x = 10 - 7$ $6x = 3$ $x = \frac{3}{6}$ I.S.W.</p>	<p>B2 B1 B1 B1 5</p>	<p>B1 for any 2 correct OR $1 + 10, 4 + 10, 9 + 10$ FT until 2nd error in (b)</p>
<p>6. (a) $\frac{104}{260} \times 100$ $= 40(\%)$ (b) 3.53 (c) $280 \div 7 \times 3$ or $280 \div 7 \times 4$ 120 and 160</p>	<p>M1 A1 B2 M1 A1 6</p>	<p>B1 for 3.5259..... rounded or truncated</p>
<p>7. Mid-points 4.5, 14.5, 24.5 sum of (mid pts \times frequency) $\div 20$ (= $240 \div 20$) 12</p>	<p>B1 M1 A1 3</p>	<p>May be implied F.T. incorrect mid-points (mid-points 5, 15, 25 gives $250 \div 20 = 12.5$: B0 M1 A1)</p>

MARK SCHEME

HIGHER TIER – PAPER 2 (CALCULATOR)

Question	Marks	Comments (Page 2)
8. (a) 3 and -3 (b) Plotting 4 points correctly All points plotted correctly AND joined with a curve (c) Approximately -1.6 and 1.6 (d) -5	B2 M1 A1 B2 B1 7	B1 for each value F.T. from (a) F.T. from their graph F.T. from their graph
9. Total is 48 (Range is 12 and greatest number is 16 ⇒) least number is 4 10 is in middle box Use of $4^{\text{th}} = 2^{\text{nd}} \times 2$ 4, 6, 10, 12, 16	B1 B1 B1 B1 B1 QWC2 7	All 5 numbers correct and in ascending order 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 Presents material in a coherent and logical manner but with some errors in use of mathematical form, spelling, punctuation or grammar OR evident weaknesses in organisation of material but using acceptable mathematical form, with few if any errors in spelling, punctuation and grammar. QWC0 Evident weaknesses in organisation of material, and errors in use of mathematical form, spelling, punctuation and grammar.
10. $(1.2)^3$ = 1.728 Increase 0.728 72.8%	M1 A1 A1 A1 4	Or new vol. $(x + 0.2x)(y + 0.2y)(z + 0.2z)$ M1 = $1.2x \times 1.2y \times 1.2z$ (= 1.728xyz) A1 Accept 73% OR use of values: M1 find volume and increased volume, allow 1 slip A1 original and increased volume, FT from the 1 slip A1 difference volumes ÷ original volume A1 72.8% or 73%
11. Overall strategy considering surface area of cuboid, cylinder and circle Curved surface area = $\frac{1}{2}\pi \times 5 \times 2$ = 15.707963..... Attempt to find the area of a circle or a half circle within working = 19.63495.... (or 2×9.817...) $2 \times 2 \times 6.5 + 8 \times 2 + 2 \times 6.5 \times 8$ – area circle + curved 142.073... (cm ²) Tins of paint = area ÷ 5 29 (tins of paint)	S1 M1 A1 M1 A1 M1 A1 m1 A1 9	Accept hidden faces for S1 Accept $\frac{1}{2}\pi \times \dots \times 2$ OR 31.4... OR 7.85... C.A.O. $2 \times \frac{1}{2} \times \pi \times 2.5^2$. Accept incorrect r . C.A.O. Method of determining the area for painting C.A.O. Only award if more than 2 marks awarded previously F.T. correct from working only if m1 awarded

MARK SCHEME

HIGHER TIER – PAPER 2 (CALCULATOR)

Question	Marks	Comments (Page 3)
12. $(x + 5)(x - 2) = 120$ $x^2 + 3x - 130 = 0$ $(x + 13)(x - 10) = 0$ $x = 10$ selected	M1 A1 M1 A1 4	OR Trial & imp.: Sub. value for x , area & compare 120 OR 2 values x an ans. >120 and an ans <120 ; OR ans 120 <i>FT for equivalent difficulty solution of equation</i> OR values to give 120 $x = 10$ Answer only $x = 10$ B4
13. Any 3 of the lines drawn correctly Correct region indicated	B3 B1 4	Award B2 for any 2 lines OR B1 for any 1 line indicated C.A.O.
14. (a) $6x(x + 3y)$ (b) $(x + 5)(x - 5)$ (c) $4n - n < 22 + 5$ $n < 9$ (d) $x = \frac{-19 \pm \sqrt{19^2 - 4(3)(11)}}{6}$ $x = \frac{-19 \pm \sqrt{229}}{6}$ $x = -0.64$ or $x = -5.69$	B2 B1 B1 B1 M1 A1 A1 8	B1 for 1 error inside bracket OR correct partial factorised FT 1 error. B0 for $n < \frac{27}{3}$. No marks if “=”. Use of correct formula, allow one slip in substitution. C.A.O. Must be correct 2 decimal places.
15. (a) 30 (seconds) (b) Frequency density 0.6, 1.9, 2.5, 3.6 and 0.7 Histogram drawn, including correct uniform scale on vertical axis, with ‘frequency density’ labelled.	B1 M1 A1 3	Allow 31
16. $\frac{h}{10+h} = \frac{3}{8}$ or equivalent $8h = 3(10+h)$ Height of removed cone 6 cm Vol. = $\frac{1}{3} \pi 8^2 \times 16 - \frac{1}{3} \pi 3^2 \times 6$ $= 1015.78(\dots \text{ cm}^3)$ or $\frac{970\pi}{3} (\text{ cm}^3)$	M1 M1 A1 M2 A1 6	Strategy mark, e.g. h is the height of removed cone Progress with correct strategy C.A.O. M1 either vol. $\left(\frac{1024\pi}{3} - \frac{54\pi}{3} = 1072 \cdot 3\dots - 56 \cdot 5\dots \right)$ <i>Incorrect heights $\neq 10$,</i> <i>M1 for correct use of their heights, OR</i> <i>M2 correct use of their heights with difference of 10</i> <i>However if 10 and >10 allow M1</i> C.A.O.
17. (a) Sine curve through the origin -1 to 1, -180° to 360° shown (b) -52° , -128° , 232° , 308°	M1 A1 B3 5	B2 for any 2 correct values, or B1 for a correct value. SC1 for all 4 but rounding error. FT their -52 for B2

MARK SCHEME

HIGHER TIER – PAPER 2 (CALCULATOR)

Question	Marks	Comments (Page 3)
18. Overall strategy, line + arc Arc AB $(68 \div 360) \times 2\pi r$ $= 6.17\dots$ (cm) Line AB , use of cos rule OR rt. angle triangle with 34° or 56° $AB^2 = 5.2^2 + 5.2^2 - 2 \times 5.2 \times 5.2 \times \cos 68^\circ$ OR $\sin 34^\circ = \frac{1}{2}AB \div 5.2$ OR $\cos 56^\circ = \frac{1}{2}AB \div 5.2$ $AB^2 = 33.82\dots$ OR $\frac{1}{2}AB = 2.907\dots$ Line $AB = 5.815\dots$ Perimeter 12(cm) or 11.9(8709...cm)	B1 M1 A1 M1 A1 A1 A1 B1 8	OR use of Sine rule F.T. provided all M marks awarded

ASSESSMENT GRID**MATHEMATICS – LINEAR****HIGHER TIER – PAPER 2 (CALCULATOR)**

Question	Assessment Objectives (Marks)			Total Mark	QWC	Functional Elements
	AO1 (45% - 55%)	AO2 (25% - 35%)	AO3 (15% - 25%)			
1		4		4		
2		4	3	7		✓
3		6		6		✓
4	2	2		4		
5	5			5		
6	6			6		
7	3			3		
8	7			7		
9			7	7	✓	
10		4		4		
11		9		9		✓
12		4		4		
13	4			4		
14	8			8		
15	3			3		
16	6			6		
17	5			5		
18			8	8		
Totals	49	33	18	100		22

SUMMARY ASSESSMENT GRIDS

SUMMARY ASSESSMENT GRIDS**MATHEMATICS - LINEAR****FOUNDATION TIER**

	Assessment Objectives			Total Marks
	AO1 (45% - 55%)	AO2 (25% - 35%)	AO3 (15% - 25%)	
Paper				
1	50%	31%	19%	100
2	55%	27%	18%	100
Totals	52%	29%	19%	200

HIGHER TIER

	Assessment Objectives			Total Marks
	AO1 (45% - 55%)	AO2 (25% - 35%)	AO3 (15% - 25%)	
Paper				
1	55%	29%	16%	100
2	49%	33%	18%	100
Totals	52%	31%	17%	200