



Foundation/Higher Paper 1a

Non-Calculator
Time allowed 15 minutes.
Total Marks 20

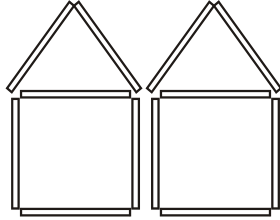
Forename

Surname

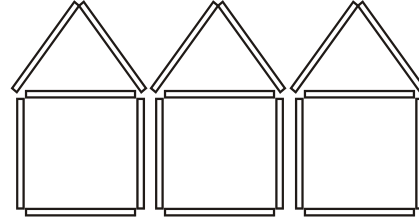
1. Here are some patterns made from matchsticks.



Pattern number 1



Pattern number 2



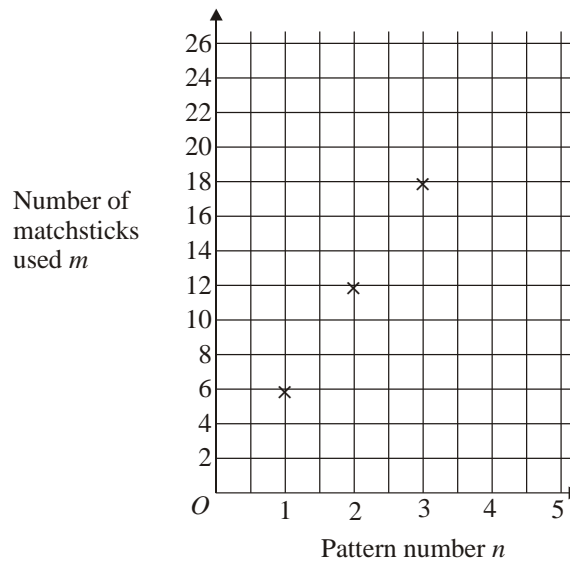
Pattern number 3

(a) Draw Pattern number 4, in the space below.

(1)

The graph shows the number of matchsticks m in pattern number n .

(b) Mark the point which shows the number of matchsticks used in Pattern number 4.



(1)

(c) How many matchsticks are used in Pattern number 10?

.....

(1)

(d) Write down a formula for m in terms of n .

.....

(1)

(Total 4 marks)

2. Rosie had 10 boxes of drawing pins. She counted the number of drawing pins in each box.

The table gives information about her results.

Number of drawing pins	Frequency	
29	2	
30	5	
31	2	
32	1	

(a) Write down the modal number of drawing pins in a box.

..... (1)

(b) Work out the range of the number of drawing pins in a box.

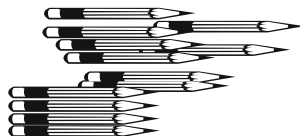
..... (1)

(c) Work out the mean number of drawing pins in a box.

..... (3)

(Total 5 marks)

3. Lisa packs pencils in boxes. She packs 12 pencils in each box. Lisa packs x boxes of pencils.



(a) Write an expression, in terms of x , for the number of pencils Lisa packs.

..... (1)

Lisa also packs pens in boxes. She packs 10 pens into each box. Lisa packs y boxes of pens.

(b) Write down an expression, in terms of x and y , for the **total** number of pens and pencils Lisa packs.

..... (2)

(Total 3 marks)

4. Simon spent $\frac{1}{3}$ of his pocket money on a computer game.

He spent $\frac{1}{4}$ of his pocket money on a ticket for a football match.

Work out the fraction of his pocket money that he had left.

.....
(Total 3 marks)

5.

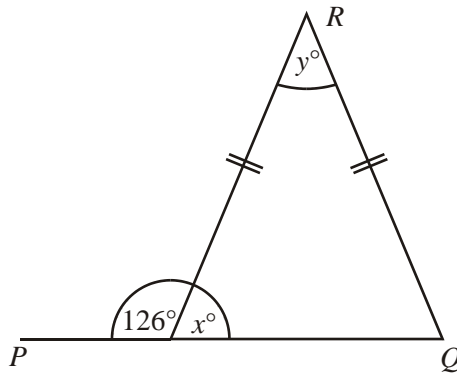


Diagram **NOT** accurately drawn

PQ is a straight line.

(a) Work out the size of the angle marked x° .

.....^o (1)

(b) (i) Work out the size of the angle marked y° .

.....^o

(ii) Give reasons for your answer.

.....
.....

(3)
(Total 4 marks)

6. $x \leq 1$

x is an integer.

Write down all the greatest possible value of x .

.....



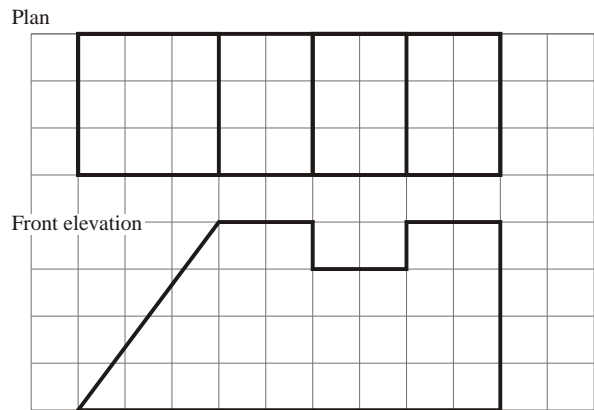
Foundation/Higher Paper 2a

Non-Calculator
Time allowed 15 minutes.
Total Marks 20

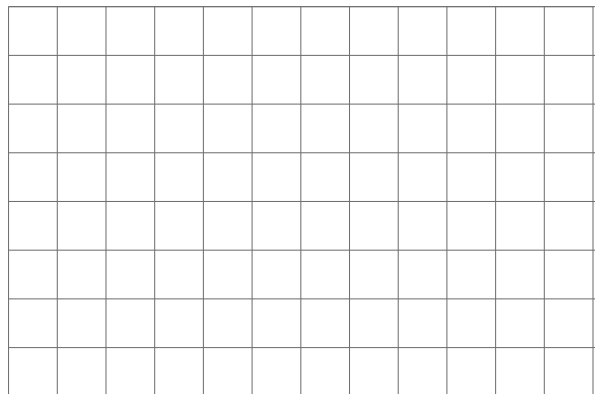
Forename

Surname

1. Here are the plan and front elevation of a prism.
The front elevation shows the cross section of the prism.



- (a) On the grid below, draw a side elevation of the prism.

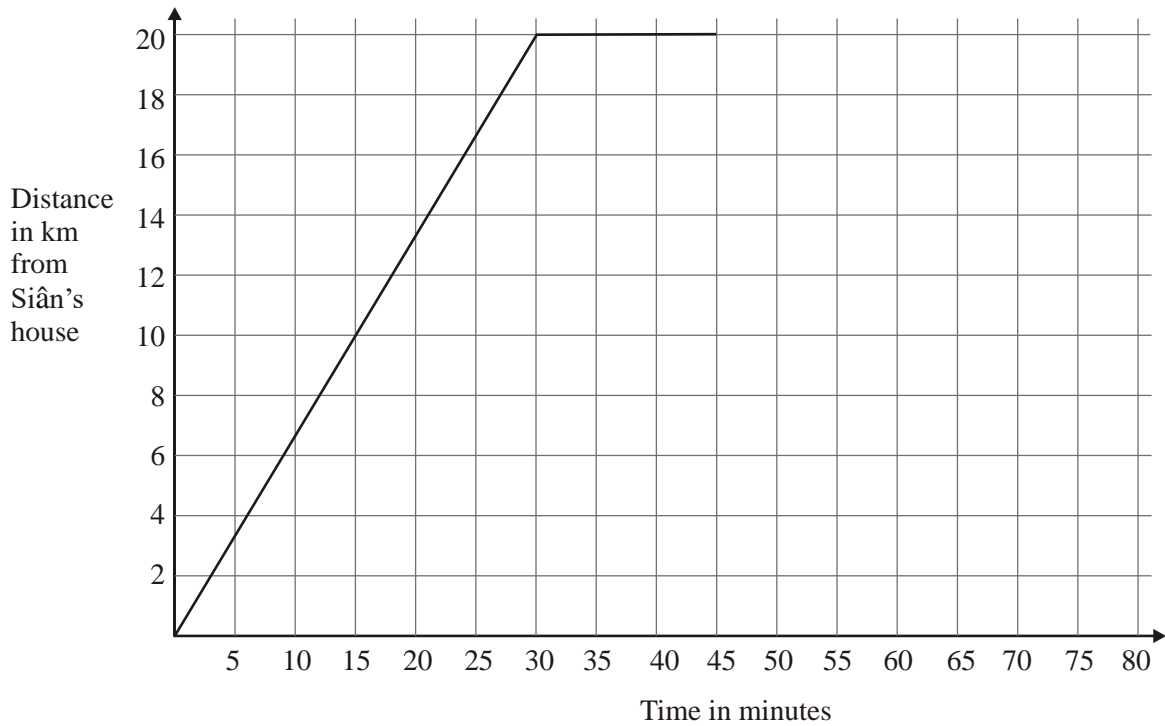


(3)

- (b) In the space below, draw a 3-D sketch of the prism.

(2)

2. Here is part of a travel graph of Siân's journey from her house to the shops and back.



(a) Work out Siân's speed for the first 30 minutes of her journey. Give your answer in km/h.

..... km/h

(2)

Siân spends 15 minutes at the shops. She then travels back to her house at 60 km/h.

(b) Complete the travel graph.

(2)

(Total 4 marks)

3. Tayub said, "When $x = 3$, then the value of $4x^2$ is 144".

Bryani said, "When $x = 3$, then the value of $4x^2$ is 36".

(a) Who was right? Explain why.

(2)

(b) Work out the value of $4(x + 1)^2$ when $x = 3$.

.....
(1)
(Total 3 marks)

4. (a) Simplify

(i) $3g + 5g$

.....

(ii) $2r \times 5p$

.....
(2)

(b) Expand $5(2y - 3)$

.....
(1)

(c) Expand and simplify

$2(3x + 4) - 3(4x - 5)$

.....
(2)
(Total 5 marks)

5. Using the information that

$97 \times 123 = 11\,931$

write down the value of

(i) 9.7×12.3

.....

(ii) $0.97 \times 123\,000$

.....

(iii) $11.931 \div 9.7$

.....
(Total 3 marks)



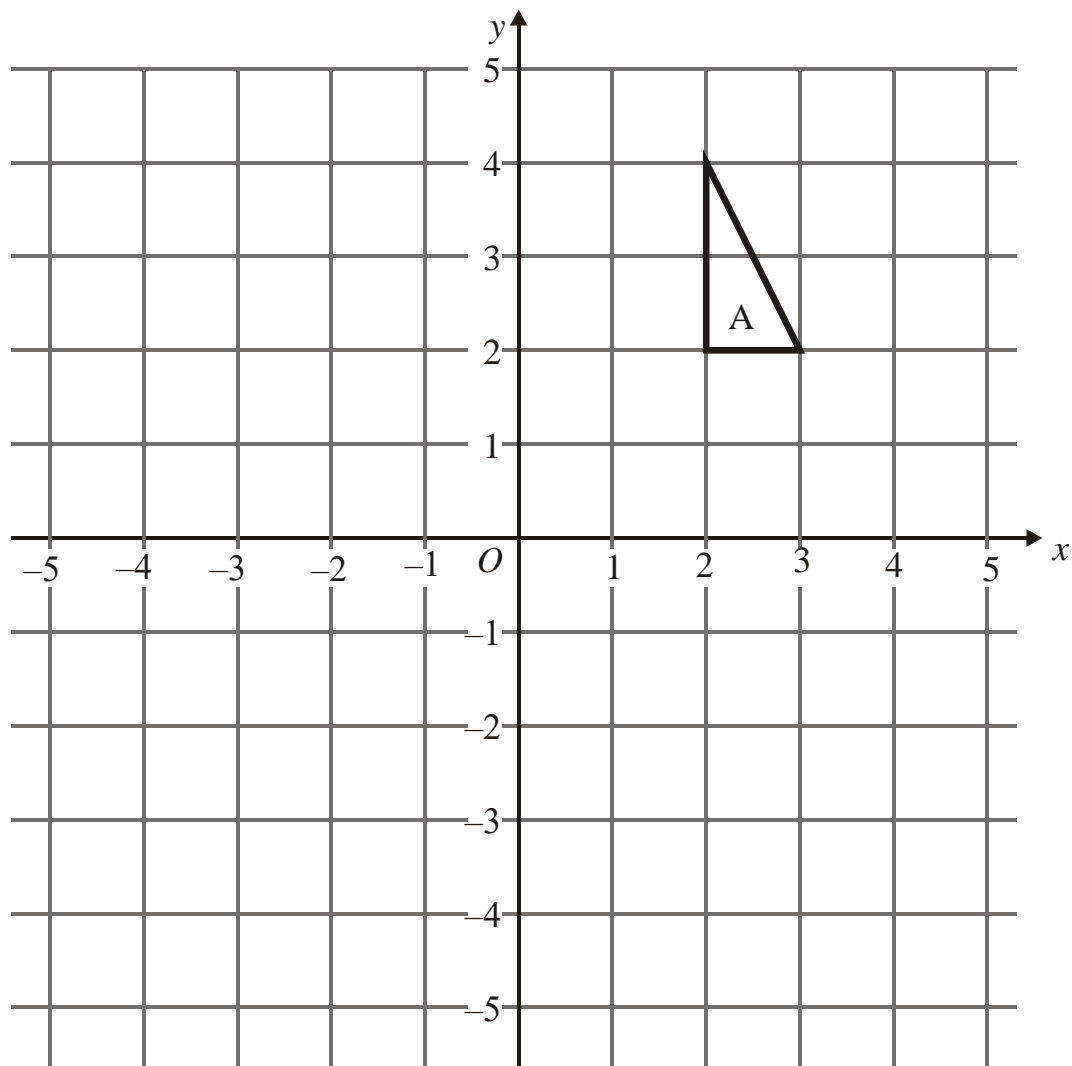
Foundation/Higher Paper 3a

Non-Calculator
Time allowed 15 minutes.
Total Marks 20

Forename

Surname

1.



- (a) On the grid, rotate triangle **A** 180° about O .
Label your new triangle **B**.

(2)

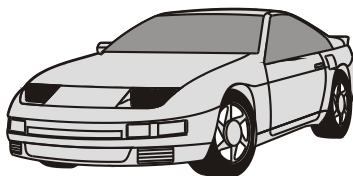
- (b) On the grid, enlarge triangle **A** by scale factor $\frac{1}{2}$, centre O .
Label your new triangle **C**.

(3)

2. Solve $7r + 2 = 5(r - 4)$

$r = \dots\dots\dots$
(Total 2 marks)

3. Ben bought a car for £12 000.



Each year the value of the car depreciated by 10%.
Work out the value of the car two years after he bought it.

£ $\dots\dots\dots$
(Total 3 marks)

4. $-2 < x \leq 1$ x is an integer. Write down all the possible values of x .

$\dots\dots\dots$
(Total 2 marks)

5. Here are the first 5 terms of an arithmetic sequence.

- 6, 11, 16, 21, 26

Find an expression, in terms of n , for the n th term of the sequence.

$\dots\dots\dots$

(Total 2 marks)

6. Change 8 m^3 to cm^3 .

..... cm^3
(Total 2 marks)

7.

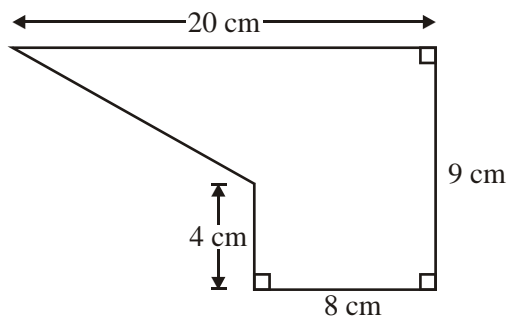


Diagram **NOT**
accurately drawn

The diagram shows a shape.
Work out the area of the shape.

..... cm^2
(Total 4 marks)



Foundation/Higher Paper 4a

Non-Calculator

Time allowed 15 minutes.

Total Marks 20

Forename

Surname

1. (a) Solve $7p + 2 = 5p + 8$

$p = \dots\dots\dots$

(2)

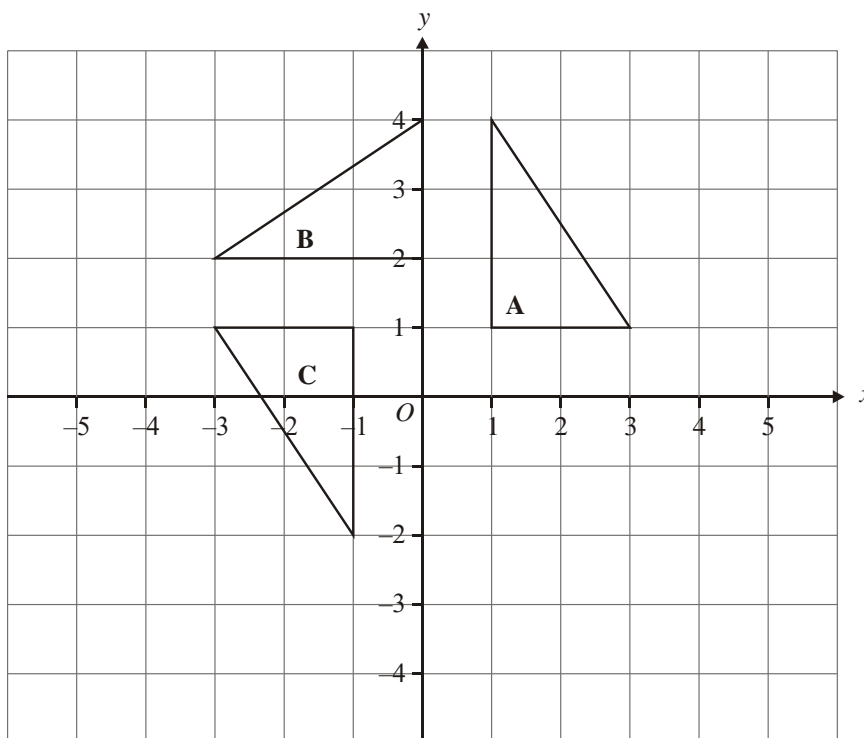
(b) Solve $7r + 2 = 5(r - 4)$

$r = \dots\dots\dots$

(2)

(Total 4 marks)

2.



Shape **A** is rotated 90° anticlockwise, centre $(0, 1)$, to shape **B**

Shape **B** is rotated 90° anticlockwise, centre $(0, 1)$, to shape **C**

Shape **C** is rotated 90° anticlockwise, centre $(0, 1)$, to shape **D**

(a) Mark the position of Shape **D**

(2)

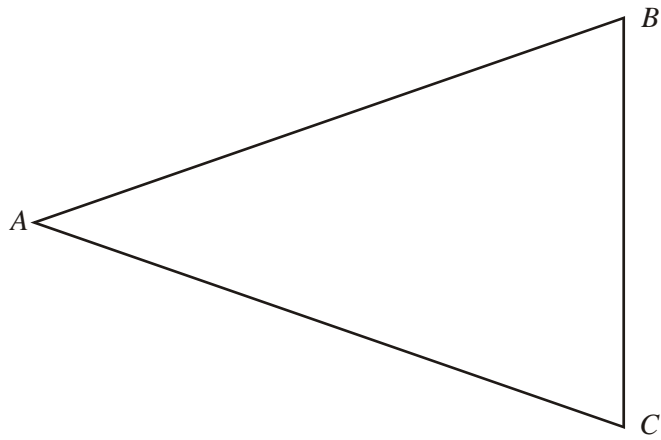
(b) Describe the single transformation that takes shape **C** to shape **A**.

.....

(2)

(Total 4 marks)

3. The diagram represents a triangular garden ABC . The scale of the diagram is 1 cm represents 1 m.
A tree is to be planted in the garden so that it is nearer to AB than to AC , within 5 m of point A .
On the diagram, shade the region where the tree may be planted.



(Total 3 marks)

4. Mr Beeton is going to open a restaurant.
He wants to know what type of restaurant people like.
He designs a questionnaire.
- (a) Design a suitable question he could use to find out what type of restaurant people like.

(2)

He asks his family “Do you agree that pizza is better than pasta?”

This is **not** a good way to find out what people who might use his restaurant like to eat.

- (b) Write down **two** reasons why this is **not** a good way to find out what people who might use his restaurant like to eat.

First reason

.....

Second reason

.....

(2)

5. The table shows information about the number of fillings the students in a class had last year.

Number of fillings	Number of students
0	10
1	5
2	4
3	2
More than 3	1

The headteacher is to choose a student at random from the class.

Find the probability that she will choose a student who had

(a) exactly 1 filling,

..... (1)

(b) 2 or more fillings,

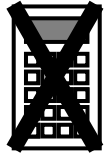
..... (1)

(c) either 1 filling or 2 fillings.

..... (1)
(Total 3 marks)

6. Factorise $t^2 - 5t$

..... (Total 2 marks)



Foundation/Higher Paper 5a

Non-Calculator

Time allowed 15 minutes.

Total Marks 20

Forename

Surname

1. Brass is made up of copper and zinc. Every 100 grams of brass contains 20 grams of zinc.

(a) Work out the weight of zinc in 60 grams of brass.

..... g

(2)

Brass contains 4 parts by weight of copper to 1 part by weight of zinc.

(b) Work out the weight of copper in 350 grams of brass.

..... g

(2)

(Total 4 marks)

2. This table is used to find numbers of rolls of insulation material needed for lofts of different floor areas.

Floor area of loft (A square feet)	Number of rolls (n)
300	6
350	7
400	8
450	9
500	10
550	11

The floor of a rectangular loft is 30 feet long and 15 feet wide.

(a) (i) Work out the floor area of this loft.

..... square feet

(ii) Write down the number of rolls of insulation material needed for this loft.

.....

(3)

n is the number of rolls of insulation material needed for a loft with a floor area of A square feet.

(b) Express n in terms of A .

$n =$

(2)

(Total 5 marks)

3. Jan measures the heights, in millimetres, of 20 plants in her greenhouse. Here are her results.

178	189	147	147	166
167	153	171	164	158
189	166	165	155	152
147	158	148	151	172

Complete the stem and leaf diagram to show this information.

Stem	Leaf

(Total 3 marks)

4. (a) Work out $\frac{2}{5} + \frac{3}{8}$

.....

(2)

(b) Work out $5\frac{2}{3} - 2\frac{3}{4}$

.....

(3)

(Total 5 marks)

5. 20 students scored goals for the school hockey team last month. The table gives information about the number of goals they scored.

Goals scored	Number of students	
1	9	
2	3	
3	5	
4	3	

Work out the mean number of goals scored.

.....



Foundation/Higher Paper 6a

Non-Calculator
Time allowed 15 minutes.
Total Marks 20

Forename

Surname

1. Simplify

(i) $3p \times 4p$

.....

(ii) $5f \times 4g$

.....

(Total 2 marks)

2. (a) Express 120 as the product of powers of its prime factors.

.....

(3)

(b) Find the Lowest Common Multiple of 120 and 150.

.....

(2)

(Total 5 marks)

3. Nassim thinks of a number. When he multiplies his number by 5 and subtracts 16 from the result, he gets the same answer as when he adds 10 to his number and multiplies that result by 3. Find the number Nassim is thinking of.

.....
(Total 4 marks)

4. (a) Simplify

(i) $p^2 \times p^7$

.....

(ii) $x^8 \div x^3$

.....

(iii) $\frac{y^4 \times y^3}{y^5}$

.....

(3)

(b) Expand $t(3t^2 + 4)$

.....

(2)

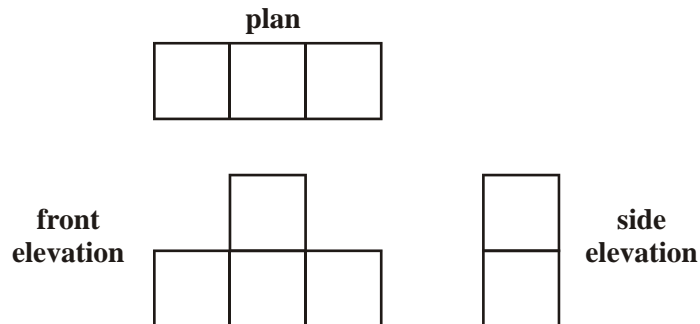
(Total 5 marks)

5. The probability that a biased dice will land on a four is 0.2 Pam is going to roll the dice 200 times. Work out an estimate for the number of times the dice will land on a four.

.....

(Total 2 marks)

6. Here are the plan, front elevation and side elevation of a 3-D shape.



In the space below, draw a sketch of the 3-D shape



Foundation/Higher Paper 7a

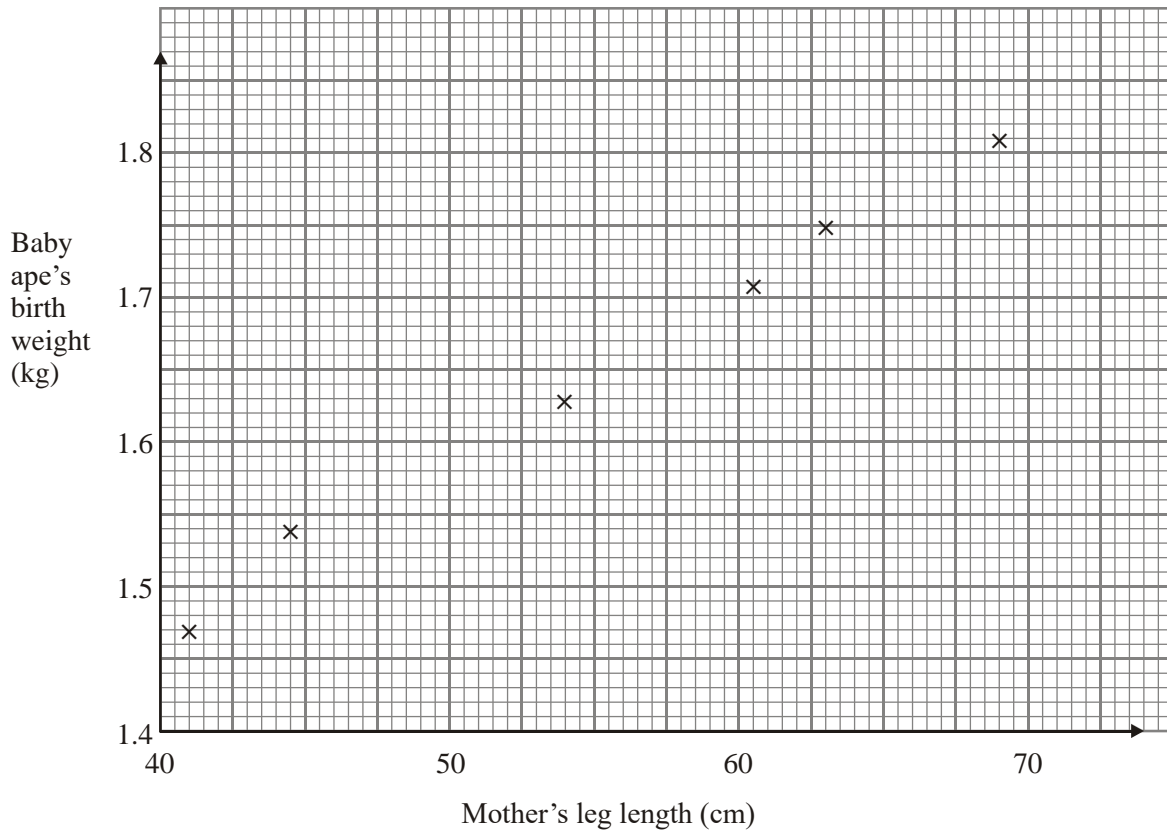
Non-Calculator
Time allowed 15 minutes.
Total Marks 20

Forename

Surname

1. The scatter graph shows some information about six new-born baby apes.

For each baby ape, it shows the mother's leg length and the baby ape's birth weight.



The table shows the mother's leg length and the birth weight of two more baby apes.

Mother's leg length (cm)	50	65
Baby ape's birth weight (kg)	1.6	1.75

- (a) On the scatter graph, plot the information from the table. (1)
- (b) Describe the **correlation** between a mother's leg length and her baby ape's birth weight.
..... (1)
- (c) Draw a line of best fit on the diagram. (1)

A mother's leg length is 55 cm.

- (d) Use your line of best fit to estimate the birth weight of her baby ape.

.....kg
(1)(Total 4 marks)

2.

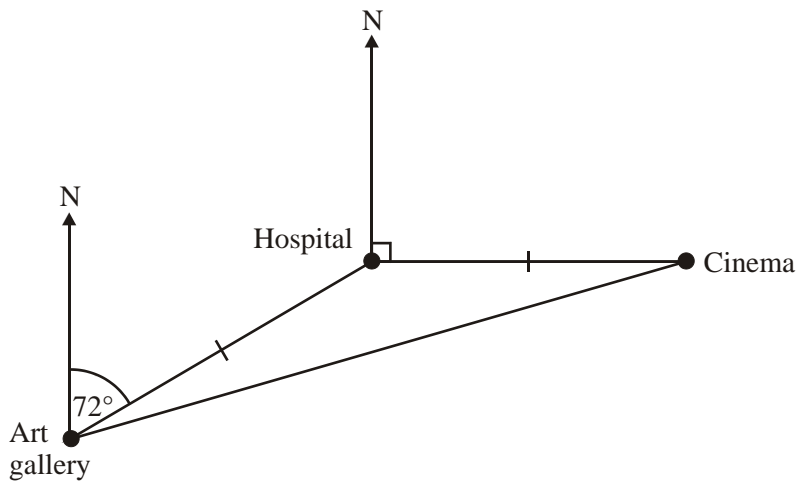


Diagram **NOT** accurately drawn

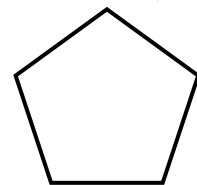
The diagram shows the position of each of three buildings in a town. The bearing of the Hospital from the Art gallery is 072° . The Cinema is due East of the Hospital. The distance from the Hospital to the Art gallery is equal to the distance from the Hospital to the Cinema. Work out the bearing of the Cinema from the Art gallery.

.....^o
(Total 3 marks)

3. Work out $5\frac{2}{3} - 2\frac{3}{4}$

.....
(Total 3 marks)

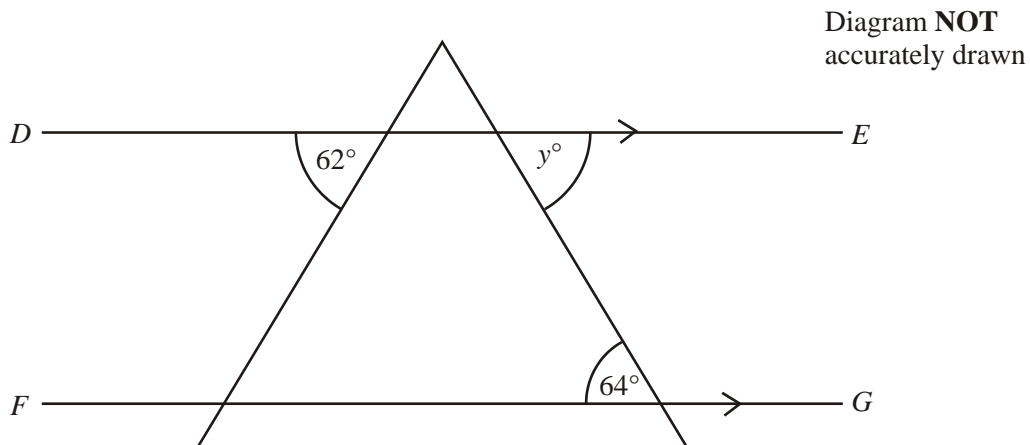
4. Here is a tile in the shape of a polygon.



The area of the tile is 8560 mm^2 . Change 8560 mm^2 to cm^2 .

..... cm^2
(Total 2 marks)

5.



DE is parallel to FG .
Find the size of the angle marked y° .

.....^o
(Total 1 mark)

6. 20 students scored goals for the school hockey team last month.
The table gives information about the number of goals they scored.

Goals scored	Number of students	
1	9	
2	3	
3	5	
4	3	

(a) Write down the modal number of goals scored.

..... (1)

(b) Work out the range of the number of goals scored.

..... (1)

(c) Work out the mean number of goals scored.

..... (3)
(Total 5 marks)

7. The probability that a biased dice will land on a four is 0.2 Pam is going to roll the dice 200 times.
Work out an estimate for the number of times the dice will land on a four.

.....
(Total 2 marks)



Foundation/Higher Paper 8a

Non-Calculator
Time allowed 15 minutes.
Total Marks 20

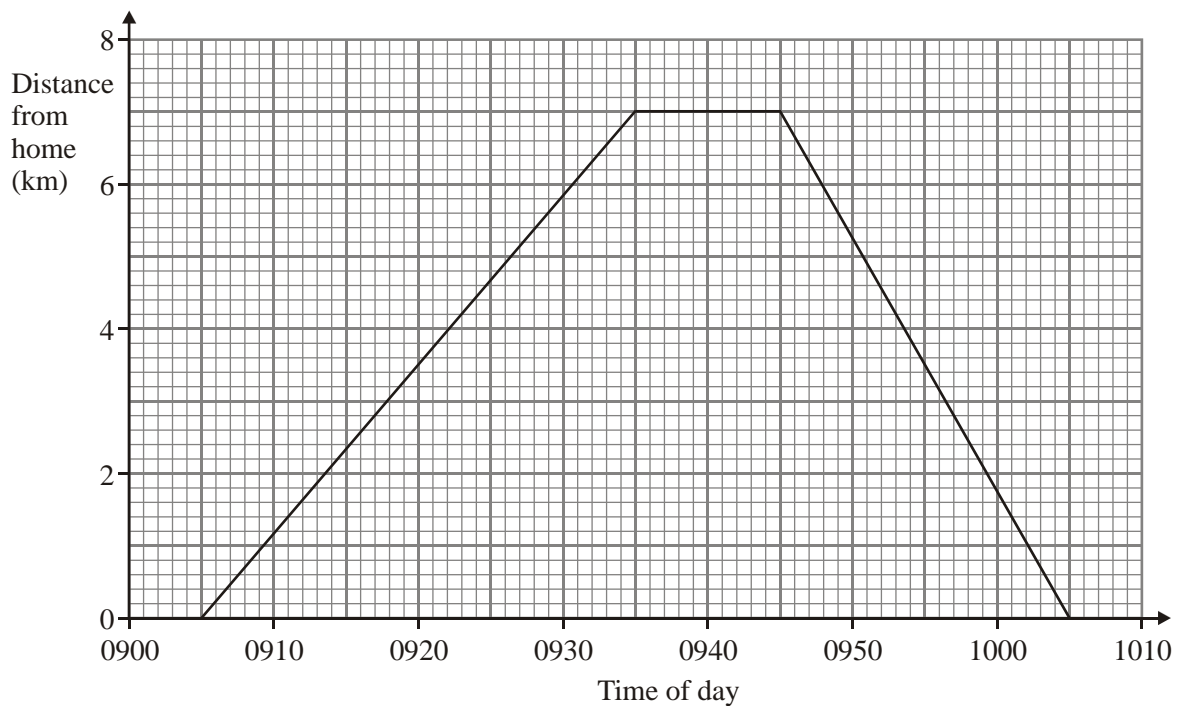
Forename

Surname

1. Factorise $x^2 - 3x$

.....
(Total 2 marks)

2. Anil cycled from his home to the park.
Anil waited in the park.
Then he cycled back home.
Here is a distance-time graph for Anil's complete journey.



- (a) At what time did Anil leave home?

..... (1)

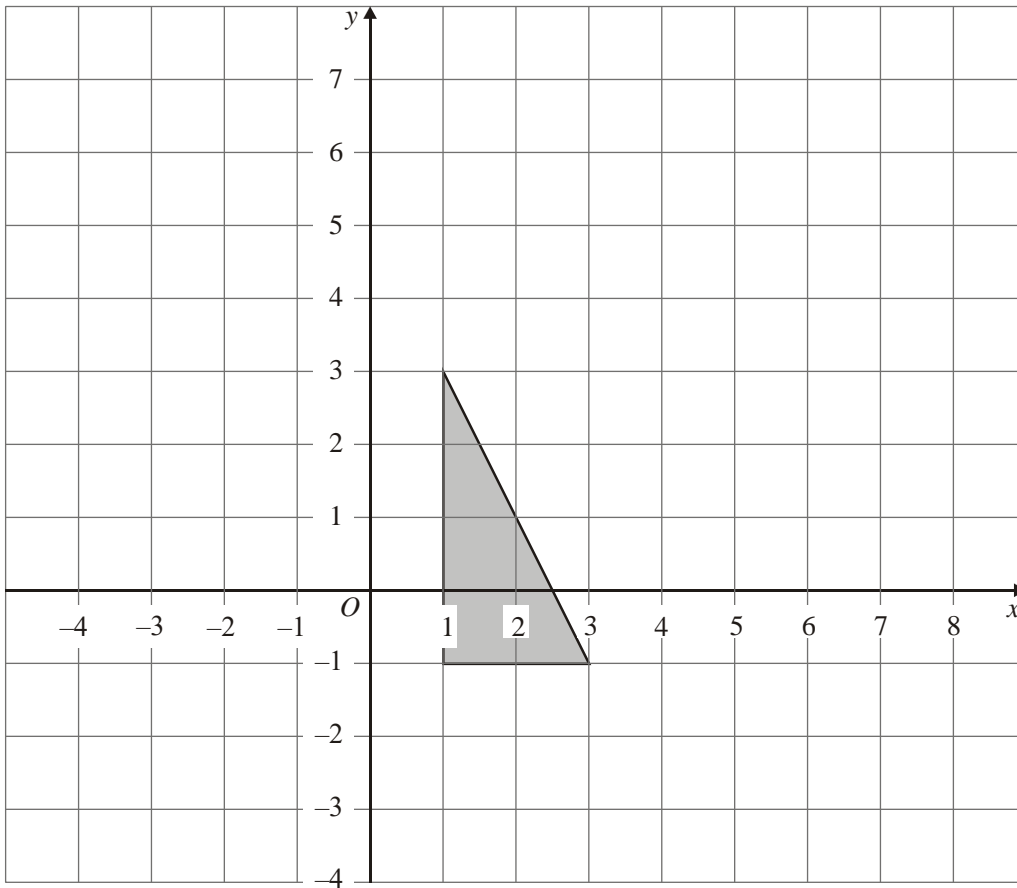
- (b) What is the distance from Anil's home to the park?

..... km (1)

- (c) How many minutes did Anil wait in the park?

..... (1)
(Total 3 marks)

3.



Enlarge the shaded triangle by a scale factor 2, centre 0.

(Total 3 marks)

4.

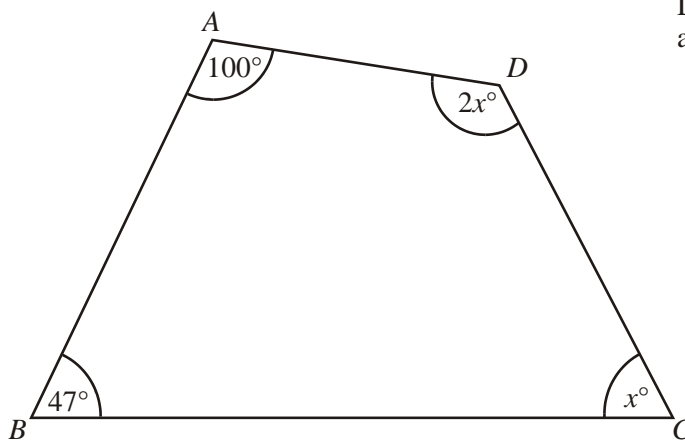


Diagram NOT accurately drawn

$ABCD$ is a quadrilateral. Work out the size of the largest angle in the quadrilateral.

.....°

(Total 4 marks)

5. (a) Use the information that

$$13 \times 17 = 221$$

to write down the value of

(i) 1.3×1.7

.....

(ii) $22.1 \div 1700$

.....

(2)

(b) Use the information that

$$13 \times 17 = 221$$

to find the Lowest Common Multiple (LCM) of 39 and 17

.....

(2)

(Total 4 marks)

6. (a) Express 108 as the product of powers of its prime factors.

.....

(3)

(b) Find the Highest Common Factor (HCF) of 108 and 24

.....

(1)

(Total 4 marks)



Foundation/Higher Paper 9a

Non-Calculator

Time allowed 15 minutes.

Total Marks 20

Forename

Surname

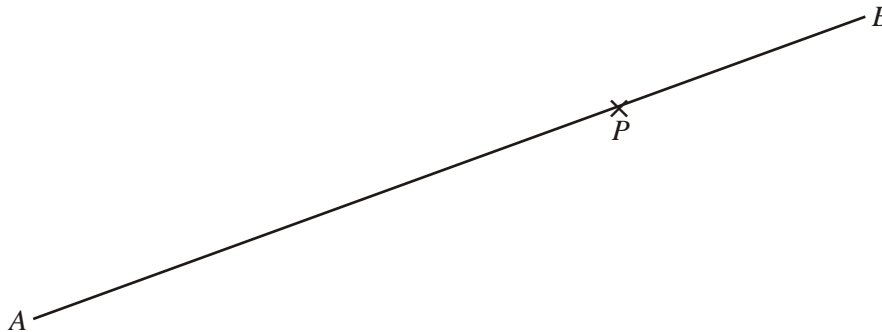
1. The table shows some expressions. The letters a , b , c and d represent lengths. π and 2 are numbers that have no dimensions. **Three** of the expressions could represent areas.

Tick (✓) the boxes underneath the **three** expressions which could represent areas.

$\frac{\pi abc}{2d}$	πa^3	$2a^2$	$\pi a^2 + b$	$\pi(a + b)$	$2(c^2 + d^2)$	$2ad^2$

(Total 3 marks)

2. Use the ruler and compasses to **construct** the perpendicular to the line segment AB that passes through the point P .
You must show all construction lines.



(Total 2 marks)

3. The diagram shows a wedge in the shape of a triangular prism.

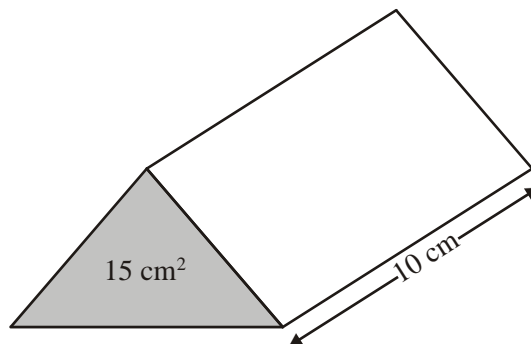


Diagram **NOT** accurately drawn

The cross section of the prism is shown as a shaded triangle.

The area of the triangle is 15 cm^2 .

The length of the prism is 10 cm.

Work out the volume of the prism.

.....

(Total 3 marks)

4. Each side of a regular pentagon has a length of 101 mm, correct to the nearest millimetre.

(i) Write down the **least** possible length of each side.

..... mm

(ii) Write down the **greatest** possible length of each side.

..... mm

(Total 2 marks)

5. Rosa prepares the ingredients for pizzas.



She uses cheese, topping and dough in the ratio 2 : 3 : 5
 Rose uses 70 grams of dough.

Work out the number of grams of cheese and the number of grams of topping Rosa uses.

Cheese g

Topping g

(Total 3 marks)

6. Emma repairs bicycles.
 She keeps records of the cost of the repairs.

The table gives information about the costs of all repairs which she carried out in one week.

Cost (£C)	Frequency
$0 < C \leq 10$	3
$10 < C \leq 20$	7
$20 < C \leq 30$	6
$30 < C \leq 40$	8
$40 < C \leq 50$	9

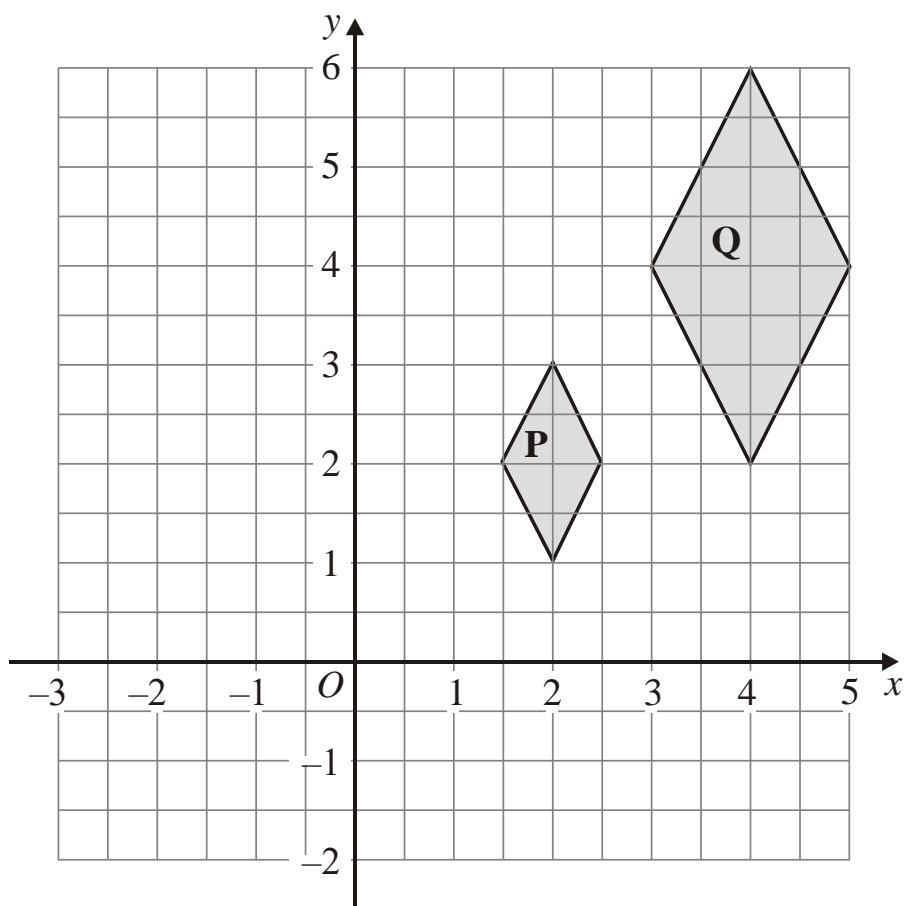
Find the class interval in which the median lies.

.....

(Total 2 marks)

7.

(i) Describe fully the single transformation that maps shape **P** onto shape **Q**.



(ii) Reflect shape **P** in the line $x = 1$

(Total 5 marks)



Foundation/Higher Paper 10a

Non-Calculator
Time allowed 15 minutes.
Total Marks 20

Forename

Surname

1. (a) Work out

$$1 - \left(\frac{1}{2} + \frac{1}{6} \right)$$

.....

(3)

- (b) Work out

$$12 \frac{1}{2} \div \frac{5}{8}$$

.....

(3)

(Total 6 marks)

2. (a) Simplify

(i) $3a + 4b - 2a - b$

.....

(ii) $5x^2 + 2x - 3x^2 - x$

.....

(4)

- (b) Expand the brackets

(i) $4(2x - 3)$

.....

(ii) $p(q - p^2)$

.....

(2)

- (c) Expand and simplify $5(3p + 2) - 2(5p - 3)$

.....

3.

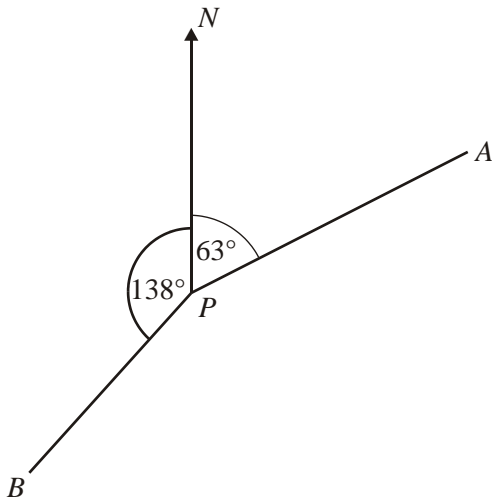


Diagram NOT
accurately drawn

Work out the bearing of

(i) *B* from *P*,

.....°

(ii) *P* from *A*,

.....°

(Total 3 marks)

4. Siân wants to collect information about the different ways in which students travel to school.

Design a suitable data collection sheet that Siân could use to collect the information.



Foundation/Higher Paper 11a

Non-Calculator
Time allowed 15 minutes.
Total Marks 20

Forename

Surname

1. On average, Nick walks 18 000 steps every day. He walks 1 mile approximately every 3500 steps.

Work out an estimate for the average distance, in miles, that Nick walks **in one year**.

..... miles
(Total 3 marks)

2. (a) Simplify

(i) $\frac{x^6}{x^2}$

.....

(ii) $(y^4)^3$

.....

(2)

- (b) Expand and simplify $(t + 4)(t - 2)$

.....

(2)

- (c) Write down the integer values of x that satisfy the inequality

$$-2 \leq x < 4$$

.....

(2)

(Total 6 marks)

3. $D = ut + kt^2$

$u = 20$

$t = 1.2$

$k = -5$

(a) Work out the value of D .

.....

(2)

$$D = 50 \quad t = 5 \quad k = -5$$

(b) Work out the value of u .

.....

(2)

(c) Make u the subject of the formula

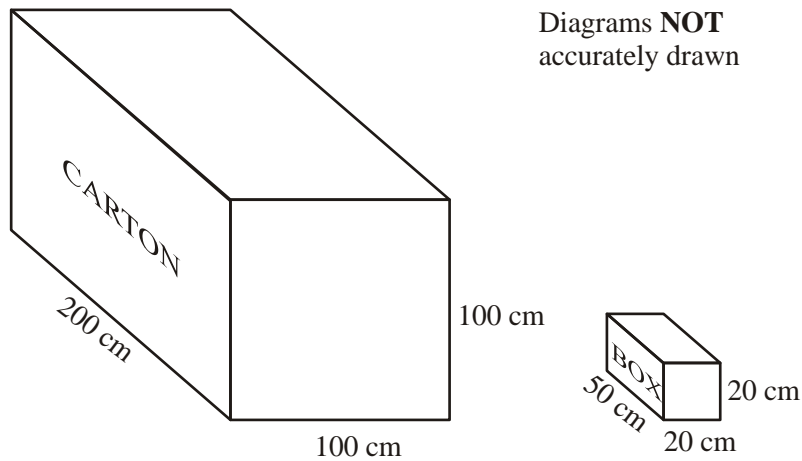
$$D = ut + kt^2$$

$$u = \dots\dots\dots$$

(2)

(Total 6 marks)

4.



A carton measures 200 cm by 100 cm by 100 cm. The carton is to be completely filled with boxes.

Each box measures 50 cm by 20cm by 20 cm.

Work out the number of boxes which can completely fill the carton.

.....

(3)

(Total 5 marks)



Foundation/Higher Paper 12a

Non-Calculator
Time allowed 15 minutes.
Total Marks 20

Forename

Surname

1. Work out $12\frac{1}{2} \div \frac{5}{8}$

.....
(Total 3 marks)

2. (a) Expand the brackets $p(q - p^2)$

.....
(1)

- (b) Expand and simplify $5(3p + 2) - 2(5p - 3)$

.....
(2)
(Total 3 marks)

3.

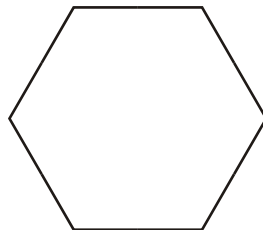
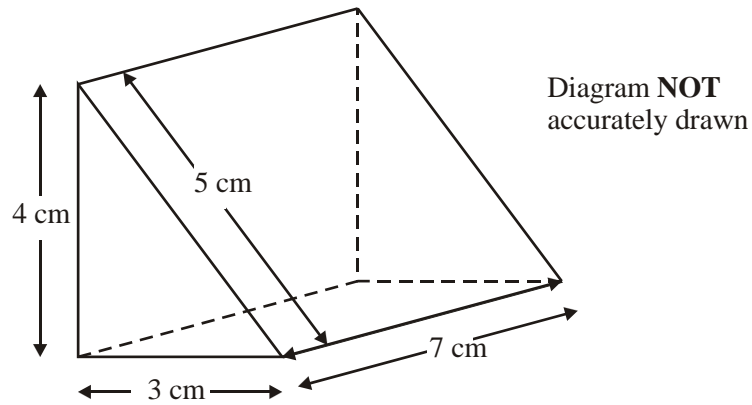


Diagram **NOT**
accurately drawn

Calculate the size of the exterior angle of a regular hexagon.

.....
(Total 2 marks)

4.



Calculate the volume of the triangular prism.

.....
(Total 4 marks)

5. (a) Simplify $3p + 2q - p + 2q$

.....
(2)

(b) Simplify $3y^2 - y^2$

.....
(1)

(c) Simplify $5c + 7d - 2c - 3d$

.....
(2)

(d) Simplify $4p \times 2q$

.....
(1)
(Total 6 marks)

6. Work out an estimate for the value of $\frac{637}{3.2 \times 9.8}$

.....
(Total 2 marks)