ALDENHAM SCHOOL

13 + Entrance Paper

SAMPLE PAPER

Mathematics

Length of Examination – 1 hour

Do not open until you are told to do so

Surname: …… School:……

First name: ……... Age: Years …… Months ……..

INSTRUCTIONS FOR CANDIDATES

- Write your answers in the spaces provided in this booklet
- Show sufficient method to show how you obtained your answers
- Calculators MUST NOT be used in any question.
- Rulers may be used.

Work steadily through the paper doing as much as you can straight away, then go back to work at the more difficult questions.

Total Number of Marks: 100

1a What is the square root of 81?

.....
(1 mark)

1b Work out 596 x 23

.....
(3 marks)

2 Emiliano asked 10 of his friends how many hours they spent using a computer each week.
The results are as follows.

8 14 20 5 0 14 9 17 3 10

2a Find the median of these numbers.

.....
(2 mark)

2b Find the range of these numbers.

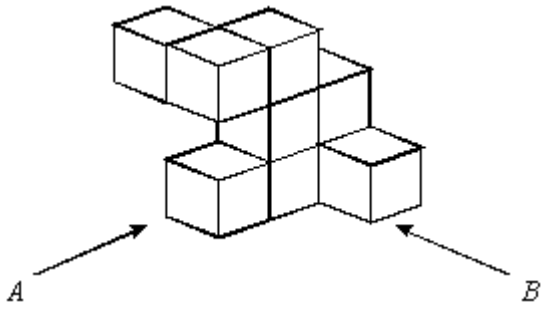
.....
(1 mark)

3 Write 0.5, 48% and $\frac{9}{20}$ in order of size starting with the smallest.

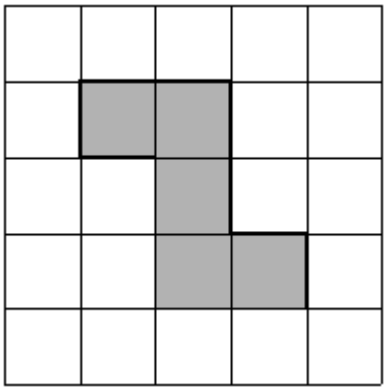
You must show your working.

.....
(2 marks)

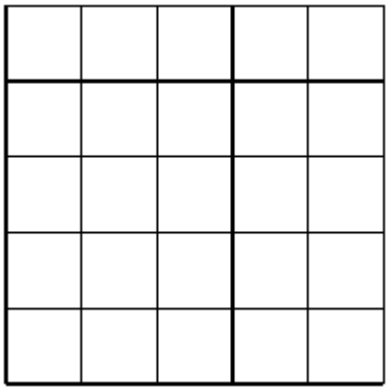
4 The diagram represents a solid made from 9 small cubes.



The view of the solid from direction *A* is shown below.



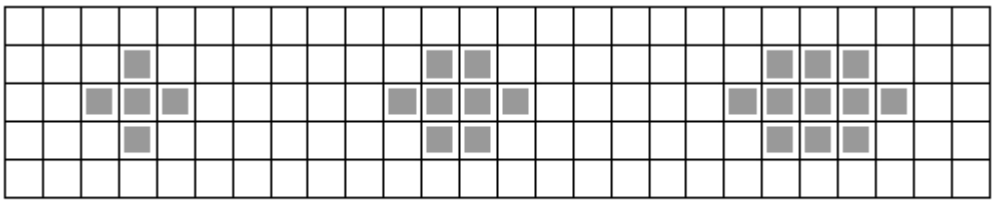
On the grid below, draw the view of the solid from direction *B*.



.....

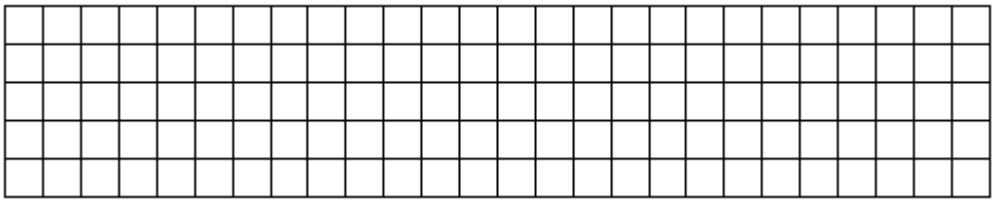
(2 marks)

5 Square tiles are used to make patterns on a grid.



Pattern 1 Pattern 2 Pattern 3

5a The pattern continues in the same way.
Draw Pattern 4



(1 mark)

5b (i) Complete this table.

Pattern Number (n)	1	2	3	4	5
Number of tiles (N)	5	8			

(1 mark)

(ii) How many tiles are in Pattern 12?

.....
(1 mark)

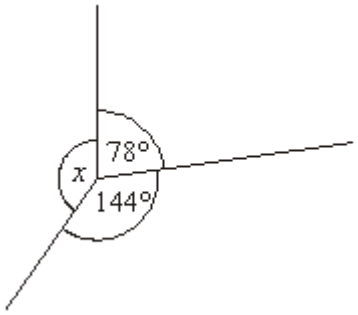
5c There are 317 tiles in Pattern 105.
How many tiles are in Pattern 104?

.....
(1 mark)

5d Find a rule linking the pattern number (n) and the number of tiles (N).

N = ...
(2 marks)

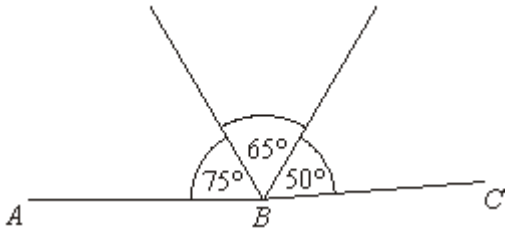
6a) Work out the size of angle x.



Not drawn accurately

x = ... degrees
(1 mark)

b)



Not drawn accurately

Xavier says that if this diagram was drawn accurately then *ABC* would be a straight line.

Is he right?
You **must** explain your answer.

.....

.....

.....

(1 mark)

7a Share £320 in the ratio 2 : 3

..... : .....
(2 marks)

7b Work out:

$3\frac{2}{5} + 4\frac{3}{10}$

.....
(1 mark)

7c Work out and simplify.

$\frac{3}{4} \times \frac{2}{7}$

.....
(2 marks)

7d A bracelet is made using only silver and gold, in the ratio is 5 : 3.
What fraction of the bracelet is composed of gold?

.....
(1 mark)

8 Solve the equations:

8a) $5n + 7 = 52$

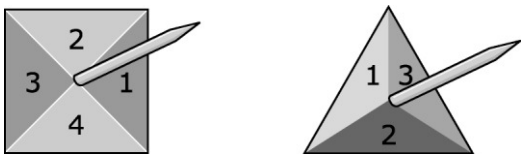
n = ...
(2 marks)

8b) $5p - 6 = 2p + 18$

p = ...
(2 marks)

9 A game is played with two spinners.

You multiply the two numbers on which the spinners land to get a final score.



The final score is 4 x 2 = 8

9a) Complete the table to show all the possible final scores
(one score has been done for you).

X	1	2	3	4
1				
2				8
3				

(2 marks)

9b) Work out the probability of getting a final score of 3.

……

(1 mark)

9c) Work out the probability of getting a final score which is an odd number.

……..

(1 mark)

9d) If I were to spin the spinner 60 times, how many times would I expected to get an odd number.

……..

(1 mark)

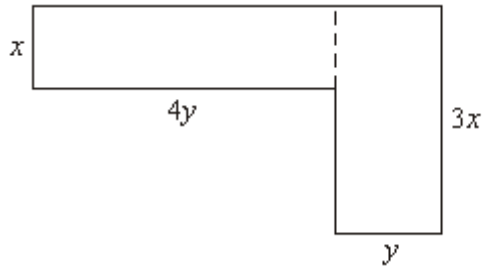
10 (a) Simplify $5c + 4c - c$

.....
(1 mark)

(b) Simplify $7x + 2y - 3x - 5y$

.....
(2 marks)

11 This shape is made up of rectangles.



Not to scale

(a) Write down an expression, in terms of x and y, for the perimeter of the shape.

.....
(2 marks)

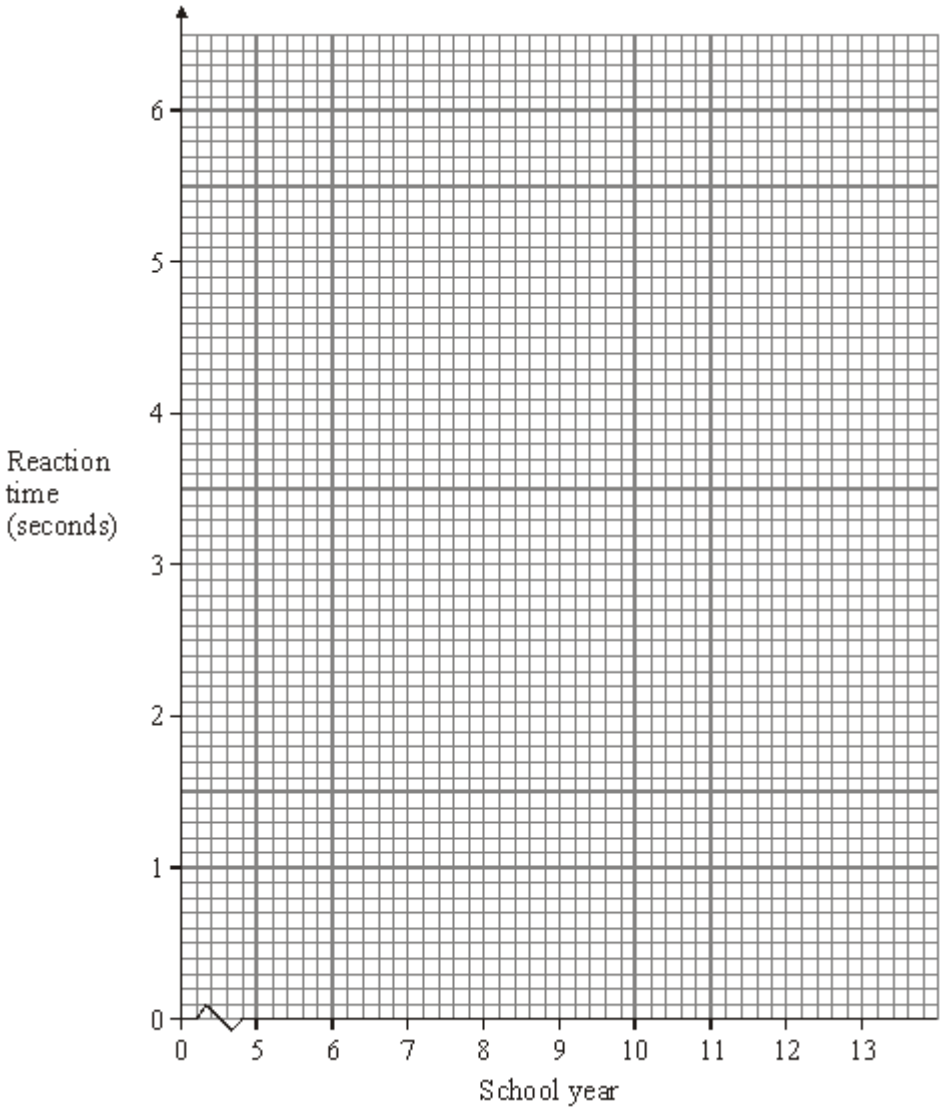
(b) If x = 2 cm and y = 5 cm, find the area of the shape.

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

12 The table shows the school year and the reaction time of eight people who took part in the same test.

School year	5	7	8	9	10	11	12	13
Reaction time (seconds)	6	5	4.8	4.5	4	4.2	3.5	3

(a) Draw a scatter graph of these data.



(2 marks)

(b) Draw a line of best fit on your scatter graph.

(1 mark)

(c) Describe the relationship shown by your scatter graph.

.....

.....

.....

(1 mark)

13 Here is a formula relating the quantities A, x and y.

$$A = y^3 + 4x$$

13a Work out the value of A when $y = 5$ and $x = -10$.

A = ...

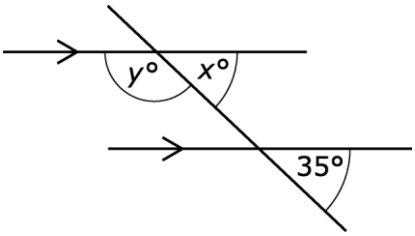
(2 marks)

13b Work out the value of x if A = 20 and y = 2

x = ...

(2 marks)

14 The diagram shows two parallel lines with a straight line crossing them diagonally.



Work out the value of:

14a angle $x°$, giving your reason

.....

.....

(2 marks)

14b angle $y°$, giving your reason

.....

.....

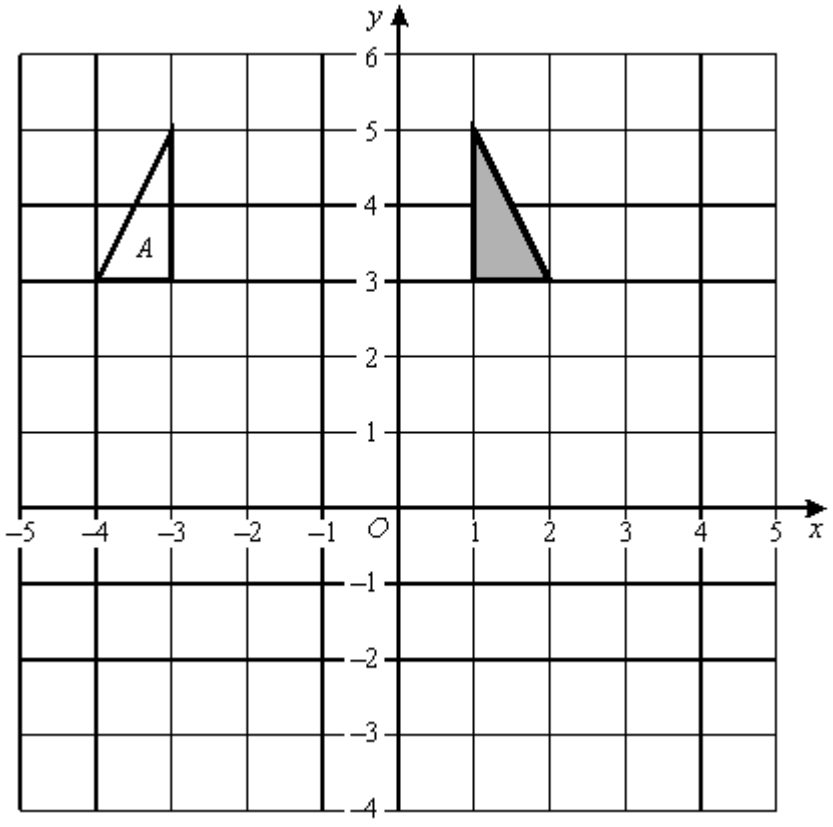
(2 marks)

15 Factorise the expression $4x + 10$

.....

(1 mark)

16a)



(i) Describe fully the single transformation that takes the shaded triangle to triangle *A*.

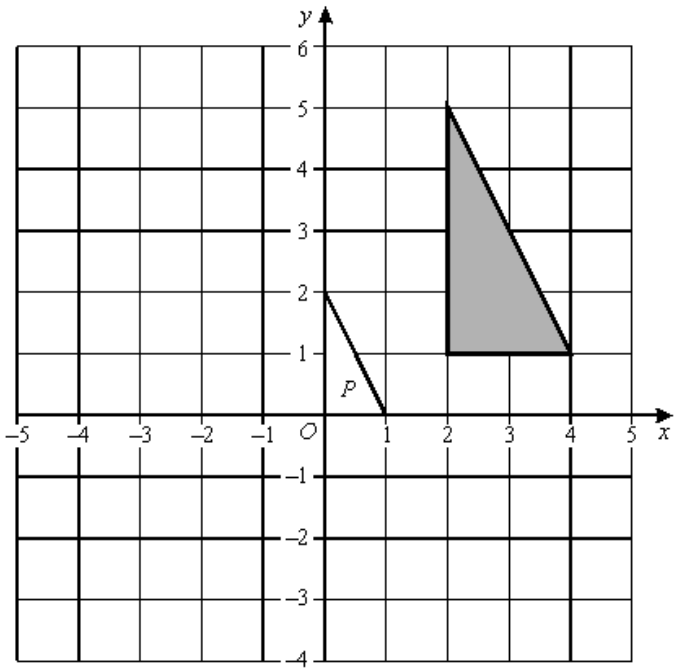
.....

(2 marks)

(ii) On the grid above translate the shaded triangle by 2 squares to the right and 4 squares down.

(1 mark)

16b) Triangle P is an enlargement of the shaded triangle.



(i) What is the scale factor of the enlargement?

.....
(1 mark)

(ii) What is the centre of enlargement?

(....., ...)
(1 mark)

17. On her way to work Mrs Shah passes through three sets of traffic lights.
She records the number of times she stops at traffic lights each day.

Number of stops each day	Frequency (number of days)	
0	2	
1	11	
2	12	
3	15	

What is the mean number of stops per day?

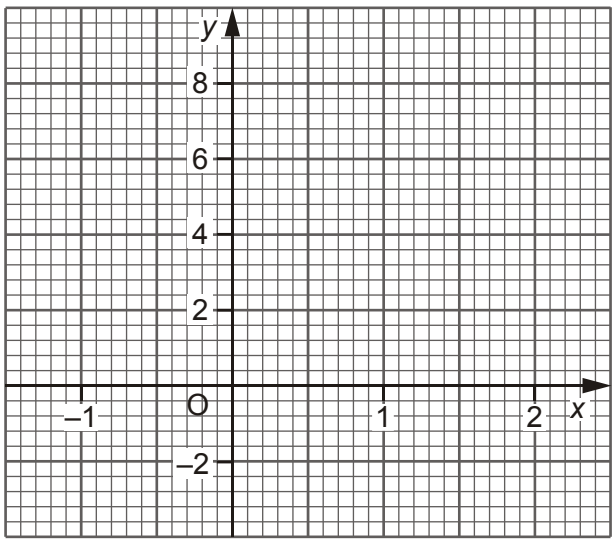
……
(2 marks)

18a Complete the table below for $y = 3x + 2$..

x	–1	0	1	2
y		2		8

(2 marks)

18b Draw the graph of $y = 3x + 2$.



(2 marks)

18c On the same grid, draw the line $y = 6$.

(1 mark)

19a A bike costs £130. Its price is reduced by 15% in a sale. Find the sale price.

……

(2 marks)

19b Dany, Claire and Ollie are having a debate.

- Dany says that if you increase an amount by 20% and then decrease it by 20% that you will end up with your original amount.
- Ollie says that it will be less.
- Claire says that it will be more.

Who is correct? Explain your answer.

……

……

……

(2 marks)

20 (a) 30 students from Year 7 are asked how they travel to school.
Their replies, walk (W), bus (B) or car (C), are shown below.

C	C	B	W	B	W	C	B	W	C
B	B	W	W	W	C	W	C	B	B
W	W	B	W	B	W	B	W	W	C

(i) Complete the tally column and the frequency column in the table.

	Tally	Frequency
Walk (W)		
Bus (B)		
Car (C)		
		Total 30

(2 marks)

(ii) Which reply is the most common?

.....
(1 mark)

(iii) What fraction of the students travel by bus?

.....
(1 mark)

(b) 30 students from Year 11 are also asked how they travel to school. Their results are shown in the table.

	Frequency
Walk (W)	13
Bus (B)	14
Car (C)	3
	Total 30

Compare how Year 7 and Year 11 travel to school.

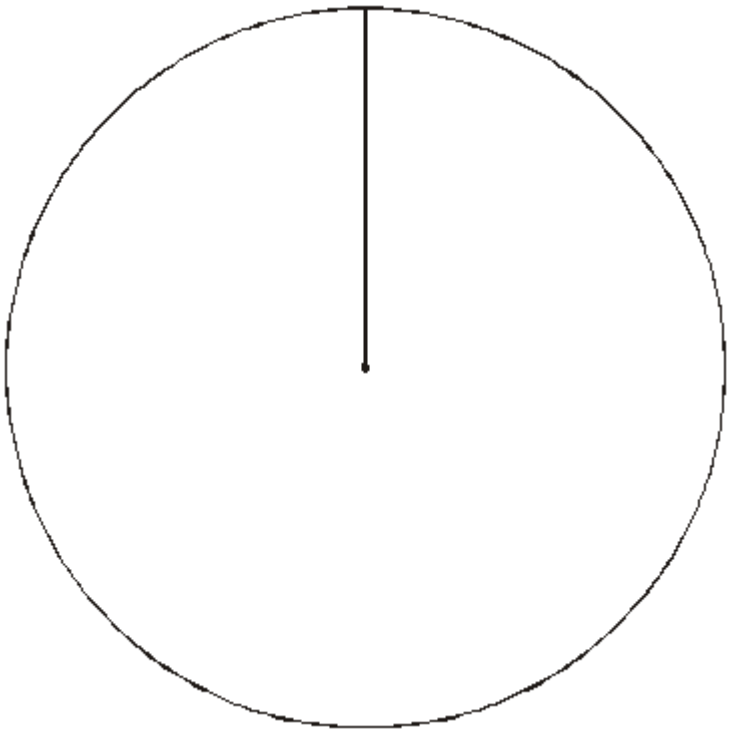
(i) Write down one difference.

.....
(1 mark)

(ii) Write down one similarity.

.....
(1 mark)

(c) Draw a fully labelled pie chart for the Year 11 data.



(3 marks)

21 40 pupils were asked about their lunch one day.

The table gives some information about their answers.

	School dinners	Sandwiches	Other	Total
Boys	15	5		22
Girls	8		7	
Total				40

21a Complete the table.

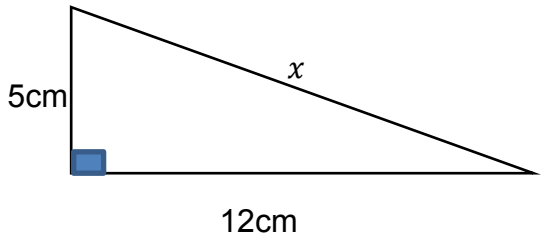
(3 marks)

21b Estimate the probability of a girl chosen at random eating sandwiches for lunch.

.....

(2 marks)

22. Calculate the length of the side x.



.....

(3 marks)

23 Susan completes a journey in two stages.
In stage 1 of her journey, she drives at an average speed of 80 km/h and takes 1 hour 45 minutes.

(a) How far does Susan travel in stage 1 of her journey?

..... km

(2 marks)

(b) Altogether, Susan drives 190 km and takes a total time of 2 hours 15 minutes.
What is her average speed, in km/h, in stage 2 of her journey?

..... km/h

(2 marks)

24 Two families go to a pantomime.

The James family of two adults and one child pay £36.

The Irish family of three adults and three children pay £66.

Work out the cost of an adult ticket and the cost of a child ticket.

Adult ticket £ ..... Child ticket £ .....

(4 marks)

25 A local bike shop is having a 20% off sale on all of its bikes.

Ben buys a bike for £432 in the sale.

a) How much would his bike have cost without the discount?

……

(2 marks)

b) Ben's new bike has a wheel diameter of 40cm. Roughly how many revolutions will each wheel make if he cycles for 1 km?

……

(3 marks)

END