Name: _____ **Candidate Number:** _____

mgs Founded 1515 | The Manchester Grammar School

ENTRANCE EXAMINATION 2010
PART 2 ARITHMETIC EXAMINATION

Time available: 60 minutes

Write your name and candidate number in the spaces provided at the top of the page.

Try to answer all the questions in the order that they appear.

Write your working and your answer in the space provided after each question. If you cannot answer a question, go on to the next.

If you run out of space for an answer, use the space provided after Question 12.

All your working must be shown because it may be worth some marks. Scrap paper must therefore not be used.

Take care to leave yourself enough time to answer all the questions. Use any time you have left to make the best attempt you can at any questions you have not done.

Calculators may not be used.

DO NOT WRITE IN THIS MARGIN

1. Write down the next number in each sequence.

(a) 5, 19, 33, 47, _____

(b) 1, 4, 9, 16, _____

(c) 2, 6, 18, 54, _____

(d) 88, 44, 22, 11, _____

(e) 300, 298, 294, 286, 270, _____

5 Marks

2.

m g km litre m^2 kg cm

Choose from the list above the **BEST** unit in which to measure each of the following.

(a) The distance from London to Sydney.

_____

(b) The mass of a sweet.

_____

(c) The capacity of a bottle of lemonade.

_____

(d) The length of a cricket pitch.

_____

(e) The area of a school playground.

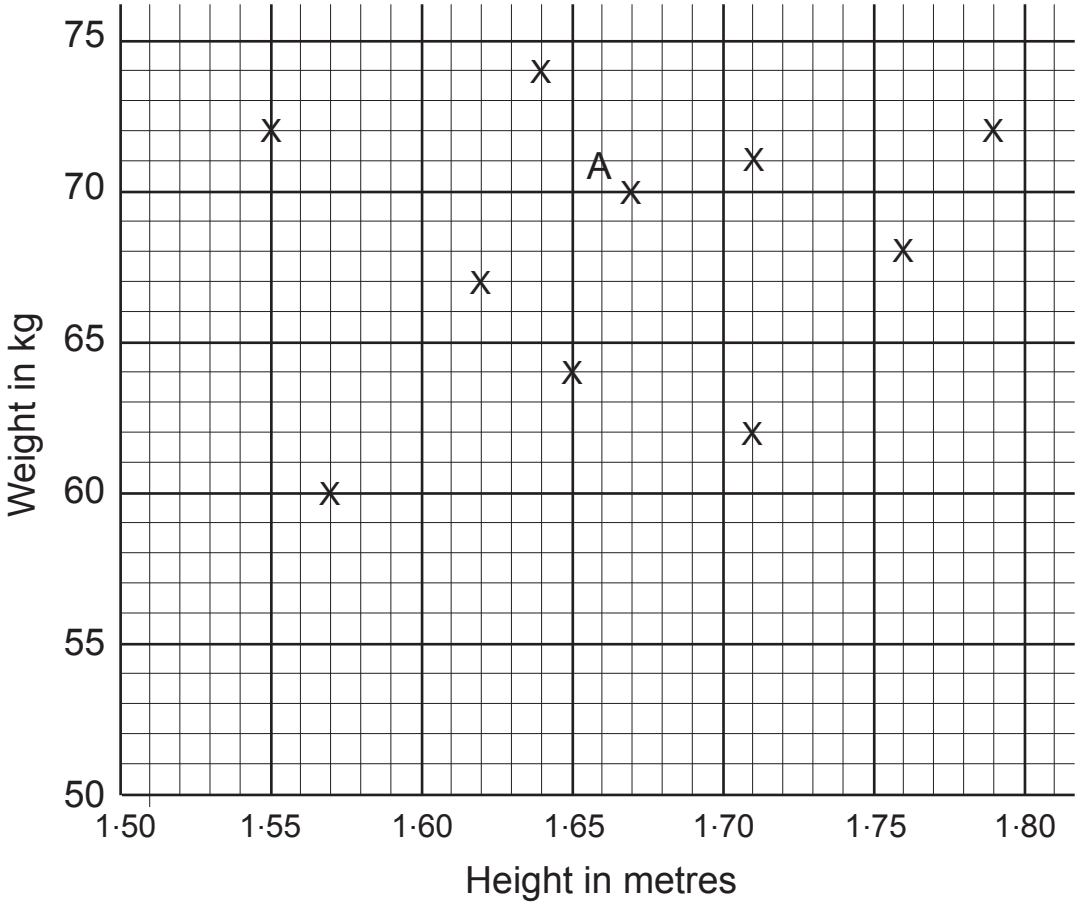
_____

5 Marks

DO NOT WRITE IN THIS MARGIN

3. On the scatter graph below each cross shows a person's height and weight.

For example the cross next to the letter A shows that Andrew is 1·67m tall and that his weight is 70 kg.



(a) What is the height of the tallest person?

_____

(b) What is the height of the lightest person?

_____

(c) What is the difference in height between the tallest person and the shortest person?

_____

(d) Stephen is 1·76 m tall. What is his weight?

_____

(e) Place a letter R on the scatter graph next to the cross which represents Robert, who is 4 cm taller than than Andrew and 6 kg lighter than Stephen.

_____

5 Marks

DO NOT WRITE IN THIS MARGIN

4. A 'preble' is a set of three numbers in which the last number is the product of the first two numbers, for example (3, 2, 6).

Work out the missing number in each of these prebles.

(a) (6, $1\frac{1}{3}$, a) a = _____

(b) (12, b, 15) b = _____

(c) (c, 11, 1045) c = _____

(d) (0·5, d, 28) d = _____

(e) (0·4, e, 0·24) e = _____

5 Marks

5. A distance of 8 furlongs is equal to 1 mile.

A horse runs a 5 furlong race in a time of 62·5 seconds.

(a) Running at the same speed, how long does it take for the horse to run 1 furlong?

_____

_____

(b) In minutes and seconds, how long does it take for the horse to run 1 mile?

_____

_____

(c) At what speed is the horse running, in miles per hour?

_____

_____

5 Marks

DO NOT WRITE IN THIS MARGIN

6. Aidan can buy wine for his shop in two ways.

Firstly, he can buy cases which each contain 12 bottles of wine. Each case costs £40.

Secondly, he can buy single bottles of wine at a cost of £4.50 each. For every 6 bottles he buys, he gets 2 extra bottles free.

Aidan decides he needs 96 bottles of wine. Work out the cost by each of the two methods and then say which method is cheaper, and by how much.

_____

_____

_____

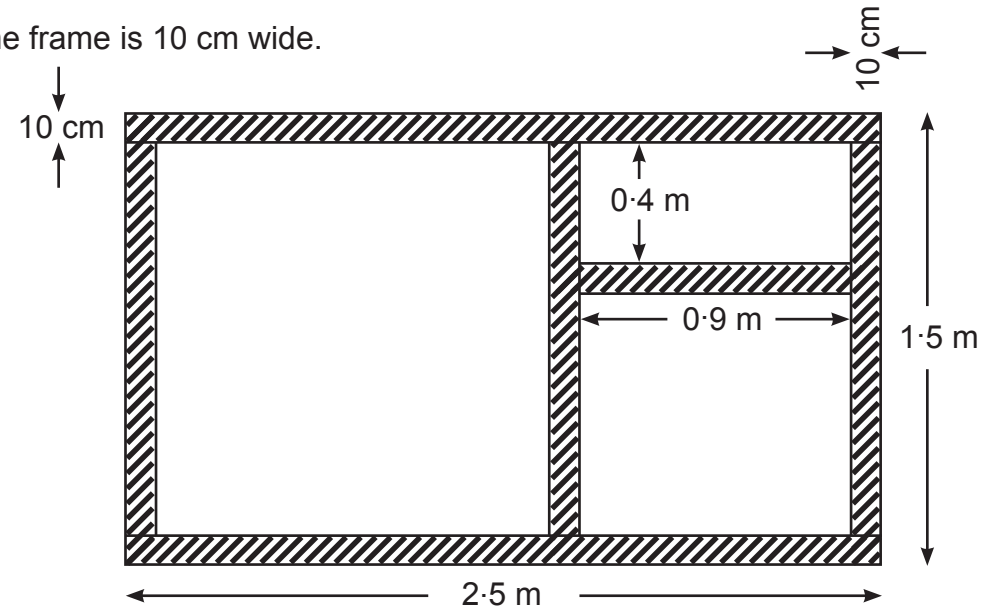
_____

_____

_____ **5 Marks**

7. A window with a wooden frame (the shaded part) is shown in the diagram below.

The frame is 10 cm wide.



Work out the area of glass that is needed.

_____

_____

_____

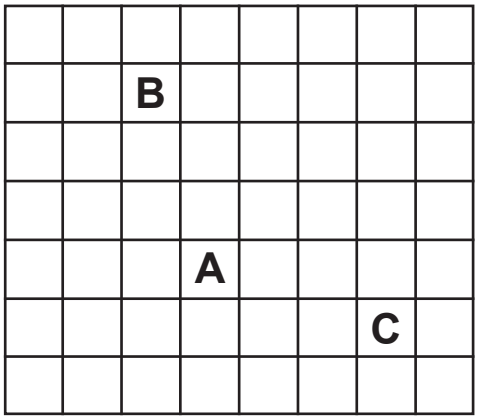
_____

_____ **5 Marks**

DO NOT WRITE IN THIS MARGIN

8. In a certain game, a counter can move
either one square vertically and then three squares horizontally
or one square horizontally and then three squares vertically.

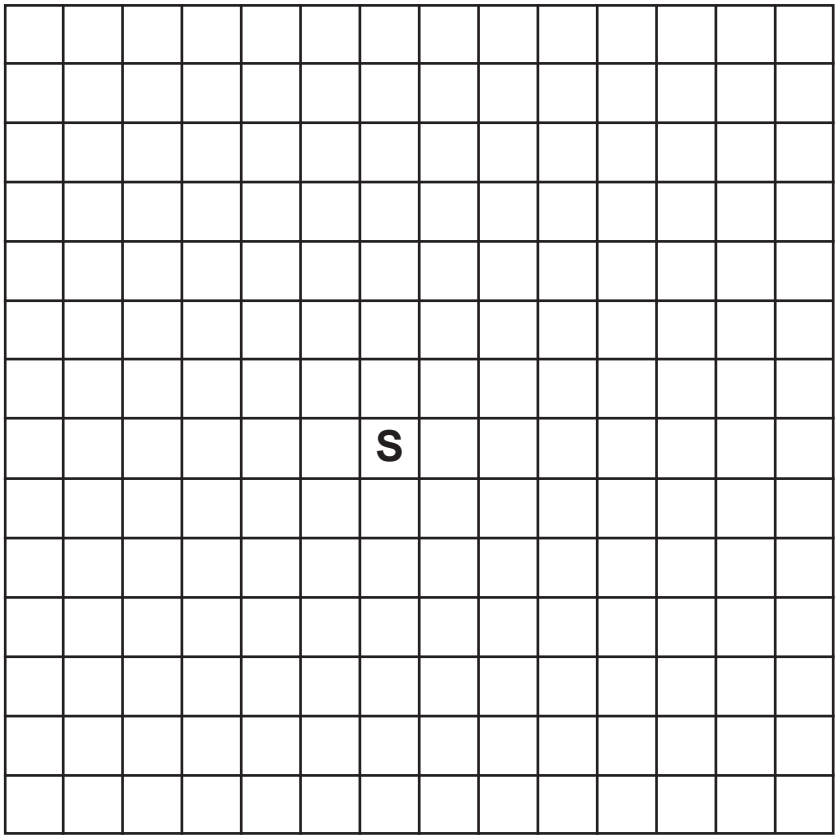
For example if the counter starts on square A in the diagram below, after one move it can be at B, or at C, or at various other squares.



In the diagram below,

(a) Place an **X** in **every** square that the counter could be after one move if it starts at S.

(b) Place an **O** in **every** square that the counter could possibly be after it had made **two moves** starting from S.



5 Marks

DO NOT WRITE IN THIS MARGIN

9. Irfan is going to cut a stick 80 cm long into pieces.

(a) If he cuts it into sixteen equal pieces, how long is each piece?

_____

_____

(b) If each piece is 25 mm long, how many pieces are there?

_____

_____

(c) If he cuts it into three pieces, so that one piece is 30% of the stick and the other two pieces are the same length as each other, what are the three lengths?

_____

_____

_____

_____

(d) If he cuts it into three pieces so that one piece is 10 cm longer than the shortest piece and the longest piece is 25 cm longer than the shortest piece. What are the three lengths?

_____

_____

_____

_____

(e) If there are four pieces, such that one is $\frac{1}{5}$ of the stick, one is $\frac{3}{10}$, and another $\frac{1}{8}$ of the stick, what are the four lengths?

_____

_____

_____

_____

10 Marks

DO NOT WRITE IN THIS MARGIN

10. The girls in a class each think of a different whole number (not including zero).

(a) Claire adds 3 to her number and then subtracts 11 from the result. She obtains the answer 7. What is Claire's number?

_____

_____

(b) Alison subtracts 3 from the product of 4 and her number. She obtains the answer 17. What is Alison's number?

_____

_____

_____

(c) Rachel multiplies her number by 3 and then subtracts 12 from the total. She finds that the answer is the same as her original number. What is Rachel's number?

_____

_____

_____

(d) Joanne squares her number and then subtracts her original number from the total. She finds that the answer is eight times as big as her number. What is Joanne's number?

_____

_____

_____

(e) When Pauline cubes her number it is nine times as large as the number itself. What is Pauline's number?

_____

_____

_____

(e) Fiona's number is 8 less than Kath's number. Kath's number is 5 times as big as Fiona's number. Find the two numbers.

_____

_____

_____

_____

10 Marks

DO NOT WRITE IN THIS MARGIN

11. In a list of numbers:

the **mode** is the number which occurs the most often;

the **median** is the number which is in the middle of the list when the numbers have been put in order;

the **mean** is the sum of all the numbers divided by how many numbers there are in the list.

For example, for the list 1, 4, 7, 1, 2,

mode = 1, median = 2, mean = $\frac{15}{5}$ = 3.

(a) Find the mode, the median, and the mean for the list 8, 5, 2, 16, 6, 5, 7.

mode = _____

median = _____

mean = _____

(b) Write down a list of three whole numbers for which the mode is 4 and the mean is 6.

_____

_____

(c) Write down a list of five whole numbers for which the mode is 9, the median is 4, and the mean is 5.

_____

_____

(d) Write down three different lists, each containing five whole numbers, so that for each list the mode is 1 and the mean is 2.

_____

_____

_____

10 Marks

DO NOT WRITE IN THIS MARGIN

12. Five countries take part in a competition.

There are 26 events in all, and in each of these a Gold medal, a Silver medal, and a Bronze medal are awarded.

The final table which shows the number of medals won by each of the five countries is shown below.

The teams are in order of the **Total** medals won, with A first, B second, and so on.

No two teams obtained the same total number of medals.

E's Gold, Silver and Bronze medals were the first three prime numbers in order. (1 is not a prime number).

D won twice as many Silver as Gold, and twice as many Bronze as Silver.

C won one more Silver than Gold.

Use this information to help you complete the table.

Position	Country	Gold	Silver	Bronze	Total
1st	A			2	
2nd	B	7			
3rd	C			4	17
4th	D				
5th	E				
		26	26	26	

10 Marks

END OF PAPER

DO NOT WRITE IN THIS MARGIN