Surname ..... **Candidate number** .....

First name .....

Current school .....

The Manchester Grammar School

Founded 1515

Entrance Examination 2024

Arithmetic Section A

30 minutes

Do not open this booklet until told to do so

Calculators may not be used

Write your names, school and candidate number in the spaces provided at the top of this page.

You have 30 minutes for this paper which is worth 20 marks.
Each question is worth 1 mark.

Answer all the questions, attempting them in order and writing your answers clearly. If you find that you cannot answer a question straight away leave it blank and return to it later if you have time. Try not to leave blank answer spaces at the end, instead make the best attempt at an answer that you can.

If you need to change an answer cross it out neatly and write the new answer alongside the box. You may use rough paper for working out, this will not be marked.

Marker 1	Methods Q1-10	Problems Q11-20	**Marker 1 TOTAL**	**Marker 2 CHECK**	**AGREED MARK**	Signature
Number Correct						
Number Wrong						

1. Work out 721 - 345

1	

2. Work out 6.75 x 40

2	

3. Work out $3\frac{3}{4} + 2\frac{2}{3}$, giving your answer as a mixed number in its simplest form.

3	

4. What is 20% of $3\frac{3}{4}$, writing your answer **as a decimal**.

4	

5. Work out 18 + 16 - 13 + 11 - 7 - 3

5	

6. Work out the result of subtracting the largest odd number below 200 from the smallest even number above 500.

6	

7. A snail moves 3mm every second. How many **centimetres** will it move in a minute?

7	cm

8. The sum 3 + 5 x 7 – 9 = 36 is incorrect. However, if one of the numbers is increased by 1, it becomes correct. Which of the numbers in the calculation should be increased?

8	

9. The sum of 10 **different, positive whole** numbers (so zero is not included) is 100. What is the largest possible value of any one of the 10 whole numbers?

9	

10. Tom wants to complete the grid shown below so that each row and each column of the grid contains the numbers 1, 2 and 3 exactly once. What is the sum of the digits in the shaded cells?

10	

1		
2	1	

FOR MARKER USE ONLY

	Q1 - 10
Number Correct	

	Q1 - 10
Number Wrong	

11. In a kitchen there are 11 cupboards, some with one door and some with two. There are 15 doors altogether.
How many cupboards have **two** doors?

11	

12. Jo puts 4 dots on a piece of paper so that **no three are in a straight line**. She now joins every dot to every other dot.
How many lines does she draw?

12	

13. In the sequence of letters MGSMATHSMGSMATHSMGSMATHS……
the phrase MGSMATHS is repeated indefinitely.
What is the 2024th letter in the sequence?

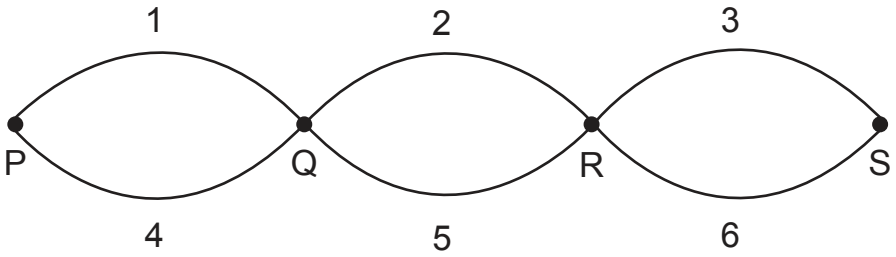
13	

14. A square piece of card with perimeter 100cm is cut into two rectangles with a single cut. The perimeter of one of the rectangles is 60cm. What is the perimeter of the other rectangle?

14	

15. Alec wants to walk from P to S along the paths shown, always moving towards S. If he adds the numbers on the paths he walks along, how many **different totals** could he get?

15	



16. In how many different ways can you spell out **MGS**, starting at the centre square and moving to the next letter in a neighbouring square either horizontally, vertically or diagonally?

16	

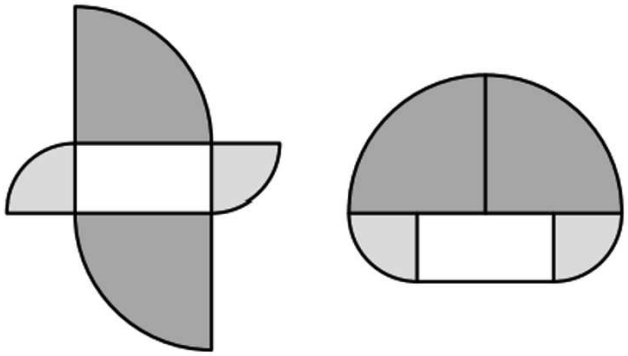
S	S	S	S	S
S	G	G	G	S
S	G	M	G	S
S	G	G	G	S
S	S	S	S	S

17. Both of the shapes in the diagram are made using the same five pieces:

    A 5cm by 10cm rectangle
    Two large quarter circles
    Two small quarter circles

    What is the difference **in cm** between their perimeters?

17		cm



18. Martyn has exactly the right number of cubes, each with sides 20cm, to make a solid cube of side 1m. If he places all the smaller cubes, side by side, to make one long straight line, how long would the line be, giving your answer in **metres**?

18		m

19. In a treasure trunk, there are 5 treasure chests. In each chest there are 4 boxes and in each box there are 10 gold coins. The trunk, chests and boxes are all locked. Pirate Pete unlocks 9 locks and takes all the coins in all the unlocked boxes. What is the **smallest** number of gold coins he could take?

19	

20. Ben thinks of a positive whole number, multiplies it by 4 and then subtracts 30. He then multiplies his answer by 2 and finally subtracts 10. His answer is a two digit number. What is the **largest** number he could have thought of?

20	

This is the end of the Examination

Use any remaining time to check your work or try any questions you have not answered.

FOR MARKER USE ONLY

	Q11 - 20
Number Correct	

	Q11 - 20
Number Wrong	