

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

First name .....

Current school .....



**The Manchester  
Grammar School**

Founded 1515

# **Entrance Examination 2023**

## **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.

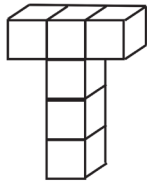
Answer all the questions, attempting them in order and writing your answers clearly. If you find that you cannot answer a question straight away leave it blank and return to it later if you have time. Try not to leave blank answer spaces at the end, instead make the best attempt at an answer that you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

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<b>Marker 1</b>	<b>Methods Q1-10</b>	<b>Problems Q11-20</b>	<b>Marker 1 TOTAL</b>	<b>Marker 2 CHECK</b>	<b>AGREED MARK</b>
Number Correct	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Number Wrong	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	

1. Work out  $423 - 134$
2. Work out  $18.2 \div 0.07$
3. Work out  $5\frac{2}{3} + 2\frac{3}{4}$ , giving your answer as a mixed number in its simplest form
4. Add up the following 3 lengths, giving your answer in centimetres.  
2.03m, 56cm, 237mm
5. Andy has 42 marbles and David has 60. David gives Andy some marbles. They now have the same number of marbles.  
How many marbles did David give Andy?
6. What is 40% of 50% of 60?
7. Tim makes a capital letter "T" using 6 cubes, each with edges 1cm long, as in the diagram:

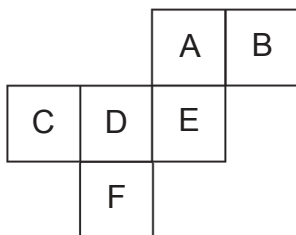


He then paints the solid letter "T" all over.  
What is the total area he paints?

8. Liam wrote down all the numbers from 1 to 20, inclusive.  
If it takes him 1 second to write down each **digit**,  
how long did it take him in total?
9. If the following numbers were arranged in numerical order,  
which one would be in the middle?

0.66,  $\frac{2}{3}$ , 0.7,  $\frac{3}{5}$ , 0.6125

10. The net below is folded to make a cube.  
What letter will be on the face opposite the letter D?



1	
2	
3	
4	cm
5	
6	
7	cm <sup>2</sup>
8	secs
9	
10	

**FOR  
MARKER  
USE ONLY**

<b>Q1 - 10</b>	
<b>Number Correct</b>	

<b>Q1 - 10</b>	
<b>Number Wrong</b>	

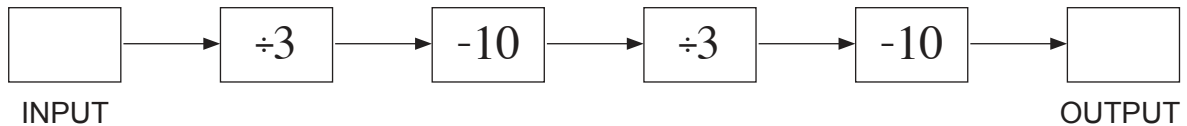
11. Three numbers multiply to make 60 and add to make 13.  
What is the largest of these three numbers?

11

12. Granny has been having a smashing time.  
Yesterday she had 15 cups and 12 matching saucers,  
but this morning she dropped a tray holding one third of the cups  
and half the saucers, breaking all those on the tray.  
How many of her cups are now without saucers?

12

13. A function machine does the four operations in the  
order shown below:



Jonathan inputs a whole number which is at least 1,  
and the output is also a whole number which is at least 1.

What is the smallest possible number that  
Jonathan could have input?

13

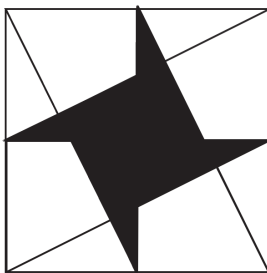
14. If the sequence 5, 12, 19, 26 is continued,  
what will be the largest 3-digit number?

14

15. The clock in my kitchen is 10 minutes slower than the clock on my phone,  
which is itself, 6 minutes slow.  
My tram always leaves 6 minutes early, although it is scheduled to leave at 8:55am.  
It takes me 20 minutes to get to the tram stop.  
What time must I leave my house, according to my kitchen clock,  
in order to catch my tram?

15

16. In the diagram, the corners of the shaded shape are at the midpoints of the sides of the large square.



What fraction of the large square is **shaded**?

16	
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17. A train which consists of an engine and three coaches is 70m long. The engine is 13m long and there is a 1m gap between the engine and the first coach and also between all the coaches. How long would a train consisting of an engine and 5 coaches be?

17		m
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18. How many **different** 3-digit numbers can be made from the digits 3, 3, 6 and 9?

18	
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19. The “abm” of a number is the product of the number one above it and the number one below it.

**e.g. the “abm” of 7 is  $8 \times 6 = 48$**

Write down the number that has an “abm” of 288.

19	
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20. Dan thinks of two numbers which differ by one and add up to **more** than seven. He then squares his two numbers (multiplies them by themselves), and works out their new difference.

This difference is less than ten.

What is the smaller of the two numbers Dan first thought of?

20	
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**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	