



Name: \_\_\_\_\_

Age: \_\_\_\_\_ Yrs \_\_\_\_\_ Mths

Group Number: \_\_\_\_\_

## FIRST YEAR ENTRANCE EXAMINATION

### MATHEMATICS

#### Section A

25 minutes

**PLEASE READ THESE INSTRUCTIONS VERY CAREFULLY**

Use pencil. No calculators or protractors or rulers are allowed.

There are 20 questions. Answer all of them if you can.

Show all your working in the spaces provided and write your answers on the lines provided.

***Please do not rub out your working.***

If you cannot do a question, leave it and go on to the next one.  
Try again later.

Do not ask a teacher to explain a question to you.

If you finish before the end of 25 minutes go back and check your answers and try to fill in any answers you have left out.

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**SECTION A**

**You have 25 minutes to complete this section. There are 20 questions.**


1. Calculate  $15.05 - 14.84$

**Answer** ..... 

2. Calculate  $31.6 \times 7$

**Answer** ..... 

3. Calculate 60% of 765

**Answer** ..... 


4. 85 people go to the school concert. They pay £1.30 each.  
How much money is collected?


Answer ...£..... 


5. Calculate  $2.4 \times (3.7 + 1.3) \div 2$

Answer ..... 

6. Fill in the missing numbers:

$\frac{1}{2}$  of 20 =  $\frac{1}{4}$  of ..... 

$\frac{3}{4}$  of 100 =  $\frac{1}{2}$  of ..... 

$\frac{1}{3}$  of 60 =  $\frac{2}{3}$  of ..... 

7. Write in the missing number to make this correct:

$$0.627 = 0.6 + 0.02 + \dots\dots\dots$$
 

8. Circle the number closest in value to 0.1

0.01            0.08            0.13            0.2            0.9



9. Here are some digit cards:

Write all the three-digit numbers, greater than 500, that can be made using these cards.



10. Write the three prime numbers which multiply to make 231:

$$\dots \times \dots \times \dots = 231$$

11. Halid makes a sequence of 5 numbers. The first number is 2. The last number is 18. His rule is to add the same amount each time. Write in the missing numbers:

2      .....      .....      .....      18

12. In this sequence each number is double the previous number. Write in the missing numbers:

.....      .....      3      6      12      24      48      .....

13. Alysha and Julia have some biscuits. Altogether they have 14 biscuits. Alysha has 2 more biscuits than Julia. How many biscuits do Alysha and Julia each have?

Alysha has ..... Julia has .....

14. Jemma thinks of a number. She says,  
“Add 3 to my number and then multiply the result by 5. The answer is 35.”  
What is Jemma's number?

Answer ..... 

15. A box contains 220 matches and weighs 45 grams.  
The empty box weighs 12 grams.  
Calculate the weight of one match.

Answer .....grams 

16. Sapna makes a fruit salad using bananas, oranges and apples.  
For every one banana, she uses 2 oranges and 3 apples.  
Sapna uses 24 fruits.  
How many oranges does she use?

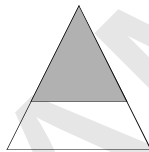
Answer .....oranges 

17. In a country dance there are 3 boys and 2 girls in every line.

42 boys take part in the dance. How many girls take part?

Answer .....girls 

18. The diagram shows a shaded triangle inside a larger triangle:



The area of the shaded triangle is  $52 \text{ cm}^2$ .

The area of the shaded triangle is  $\frac{4}{9}$  of the area of the larger triangle.

Calculate the area of the larger triangle.

Answer ..... $\text{cm}^2$  

19. 17 multiplied by itself gives a 3-digit answer:

$$\begin{array}{|c|c|} \hline 1 & 7 \\ \hline \end{array} \times \begin{array}{|c|c|} \hline 1 & 7 \\ \hline \end{array} = \begin{array}{|c|c|c|} \hline 2 & 8 & 9 \\ \hline \end{array}$$

Find the smallest 2-digit number that can be multiplied by itself to give a 4-digit answer, and put all the numbers in the boxes below:

$$\begin{array}{|c|c|} \hline & \\ \hline \end{array} \times \begin{array}{|c|c|} \hline & \\ \hline \end{array} = \begin{array}{|c|c|c|c|} \hline & & & \\ \hline \end{array} \img alt="pen icon" data-bbox="885 455 925 478"/>$$

20. Write in the missing digits (one digit in each space):

$$323 \times \dots 7 = 1518 \dots \img alt="pen icon" data-bbox="665 570 710 595"/>$$

**END OF SECTION A. NOW GO BACK AND CHECK YOUR ANSWERS**





Name: \_\_\_\_\_

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## FIRST YEAR ENTRANCE EXAMINATION

### MATHEMATICS

#### Section B

25 minutes

**PLEASE READ THESE INSTRUCTIONS VERY CAREFULLY**

Use pencil. No calculators or protractors or rulers are allowed.

There are 10 questions. Answer all of them if you can.

Show all your working in the spaces provided and write your answers on the lines provided. Use the back pages if necessary.

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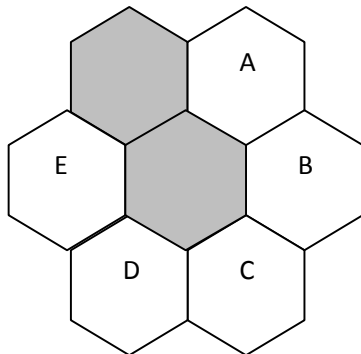
If you finish before the end of 25 minutes go back and check your answers and try to fill in any answers you have left out.

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**SECTION B**

You have 25 minutes to complete this section. There are 10 questions.

1. In the diagram below, we want to complete the pattern of 3 shaded and 4 unshaded hexagons. Which hexagon do I shade for my final pattern to have exactly 2 lines of symmetry?



Answer ..... 

2. In the grid below, each letter represents a number. The numbers on the right hand side represent the total of each row, and the numbers at the bottom show the totals of each column. Which numbers should replace each of the letters?

A	D	D	D	29
B	A	B	D	27
C	B	C	B	x
A	A	A	A	32
31	y	30	28	

A=..... B=..... C=..... D=.....

x=.....

y=..... 

3. I am thinking of a number that when I multiply it by two and divide the result by four, then multiply the result of that by itself, gives me a number that when I subtract four and divide by ten, gives me six. What is the number that I originally thought of?

Answer ..... 

4. My watch is set to show the correct time at 12 noon on Wednesday.  
It gains 4 minutes every 3 hours.
- (a) What time does the watch show when the correct time is 12 noon on Friday, assuming the watch has not been reset again?

Answer ..... 

- (b) The watch is reset again to show the correct time at 12 noon on Friday.  
What is the correct time when the watch is showing 19:40 on Friday night?

Answer ..... 

5. Three apples and a banana cost 32p. Six apples and a banana cost 53p.  
How much does one banana cost?

Answer .....p 

6. The combined age of Alan and Ben is forty three.  
The combined age of Alan and Carl is fifty five and the combined age of Ben and Carl is sixty-six.

(a) What is the combined age of Alan, Ben and Carl?

Answer ..... 

(b) How old is Alan?

Answer ..... 

7. A palindromic number is a number that can be read the same forwards and backwards, *e.g.* 33 and 797.  
How many of such numbers are there between 10 and 1000?

Answer ..... 

8. After a card game, four gamblers had £234 between them. Harry had £20 more than Dana, Charlotte had £53 more than Dana and Sid had £71 more than Dana.  
How much did each of them have?

Dana=£..... Harry=£..... Charlotte=£..... Sid=£..... 


9. There are 6 fangos in a rango and 15 rangos in a bango.
- (a) Alex has 9 rangos and 4 fangos. Barbara has 7 rangos and 3 fangos.  
How many fangos do they both have in total?

Answer .....fangos 

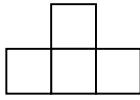
- (b) What fraction of a bango do 12 fangos represent?

Answer ..... 

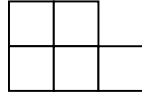
- (c) How many whole bangos are there in 274 fangos?  
How many fangos are left over?

Answer .....bangos and .....fangos 

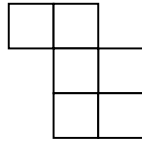
10. Four of the five jigsaw pieces shown below fit together to make a square. Which one of these diagrams does not fit?



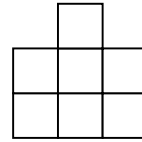
**A**



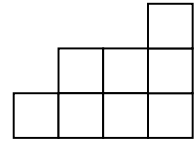
**B**



**C**



**D**



**E**

SAMPLE

Answer ..... 

**END OF SECTION B. NOW GO BACK AND CHECK YOUR ANSWERS**



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## FIRST YEAR ENTRANCE EXAMINATION

### MATHEMATICS

#### Section C

25 minutes

**PLEASE READ THESE INSTRUCTIONS VERY CAREFULLY**

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There are 5 questions. Answer all of them if you can.

Show all your working in the spaces provided and write your answers on the lines provided. Use the back pages if necessary.

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**SECTION C**

**You have 25 minutes to complete this section. There are 5 questions.**

**1.** The numbers 1 to 500 are arranged in order in a table:

	<b>Column 1</b>	<b>Column 2</b>	<b>Column 3</b>	<b>Column 4</b>	<b>Column 5</b>	<b>Column 6</b>	<b>Column 7</b>
<b>Row 1</b>	1	2	3	4	5	6	7
<b>Row 2</b>	8	9	10	11	12	13	14
<b>Row 3</b>	15	16	17	18	19	20	21
<b>Row 4</b>	22	23	24	25	26	27	28

Only rows 1, 2, 3 and 4 are shown, but there are **many more rows**.

(a) What do you notice about the numbers in column 7?

**Answer** ..... 

(b) What is the last number in row 8?

**Answer** ..... 


(c) What is the last number in row 100?

**Answer** ..... 

(d) 77 is the last number in which row?

**Answer ...Row**..... 

(e) What is the number in row 12 and column 3?

**Answer** ..... 

(f) What row and column will contain the number 400?

**Answer ...Row.....Column.....** 

2. You are told that  
 $N_5$  means 'add up the first 5 counting numbers', so  $N_5 = 1 + 2 + 3 + 4 + 5 = 15$   
 $O_3$  means 'add up the first 3 odd numbers', so  $O_3 = 1 + 3 + 5 = 9$   
 $E_4$  means 'add up the first 4 even numbers', so  $E_4 = 2 + 4 + 6 + 8 = 20$   
 and so on.

(a) Work out the following

$$E_7 =$$

Answer ..... 

$$N_8 =$$

Answer ..... 

$$N_9 =$$

Answer ..... 

(b) Find the value of  $N_{401} - N_{400}$

Answer ..... 

(c) There is a different way of finding, for example,  $O_7$ :

$$O_1 = 1 = 1^2$$

$$O_2 = 1 + 3 = 4 = 2^2$$

$$O_3 = 1 + 3 + 5 = 9 = 3^2$$

⋮

$$O_7 = 1 + 3 + 5 + 7 + 9 + 11 + 13 = 49 = 7^2$$

Find the value of  
 $O_{13} =$

Answer ..... 

- (d) Notice that  $N_6$  can be split into 2 parts to make the calculation easier:

$$N_6 = 1 + 2 + 3 + 4 + 5 + 6 = O_3 + E_3$$

Complete the following line by filling in the boxes.

$$N_{10} = O \square + E \square \quad \text{pen icon}$$

- (e) You are told that  $N_{200} = 20100$  and  $N_{401} = 80601$ .  
Use this information to work out the following:

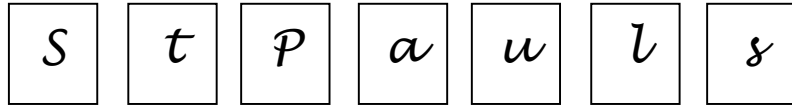
$$E_{100} =$$


Answer ..... 


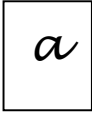
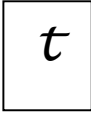
$$E_{200} =$$


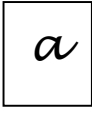

Answer ..... 

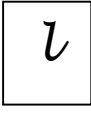


3. The letters on the 7 cards below have a number 1, 2, 3, 4, 5, 6 or 7 on the back, **but not in that order.**



If  has the number 1 on the back and the cards

   add up to 8,

   add up to 9,

   add up to 11.

(a) What does     add up to?

Answer .....



(b) What does 

<i>s</i>
----------

<i>p</i>
----------

<i>l</i>
----------

<i>a</i>
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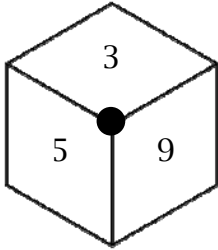
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 add up to?

SAMPLE

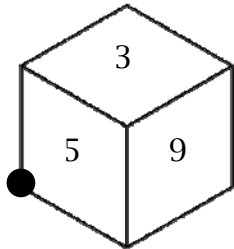
Answer ..... 

4. You are told that the opposite sides of a cube add up to 13.  
Find the sum of the faces that border with the marked corner:

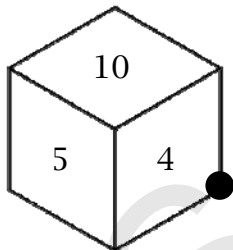


For example, the sum of the faces =  $3 + 5 + 9 = 17$ .

- (a) Find the sum of the faces that border with the marked corner for the following:

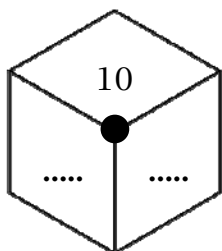


Answer .....



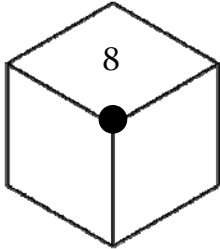
Answer .....

- (b) The **same** cube is rolled so a 10 is on top.  
Fill in the missing sides so that the sum of the faces that border with the marked corner is 27.



- (c) The **same** cube is rolled so an 8 is on top.  
Write down **all possibilities** for the sum of the missing faces that border with the marked corner.

**You MUST show your working**



SAMPLE

**Answers**

.....

.....

..... 



5. On the island of Mathia the people use patterns instead of numbers like ours.  
Here are some facts about Mathian numbers:

$$\textcircled{\diagdown} + \textcircled{\diagdown} = \square$$

$$\textcircled{\diagdown} + \blacksquare = \square + \textcircled{\bullet}$$

$$\textcircled{\bullet} + \boxtimes = \square + \blacksquare$$

Now answer these questions.

**(Give your answer in Mathian numbers using just ONE symbol)**

(a)  $\square - \textcircled{\diagdown} =$

Answer ..... 

(b)  $\textcircled{\diagdown} + \square =$

Answer ..... 

(c)  $\ominus + \odot =$

SAMPLE

Answer ..... 

**END OF SECTION C. NOW GO BACK AND CHECK YOUR ANSWERS**