BEYOND MATHS

PRIMARY SCHOOL CHALLENGE 2023

LEVEL 2 CHALLENGE
GRADE 6 AND 7 ROUND TWO

INSTRUCTIONS

1. The time allocated for this paper is $1\frac{1}{2}$ hours. All participants must remain for the full allocated time. Under no circumstances may extra time be given.

2. **This paper consists of 15 Questions over 3 Sections**.

Section A consists of 5 multiple choice questions. Each question is worth 1 mark.
Circle the letter you have chosen as your answer in pen. Should you wish to change an answer, put a cross over the letter and then circle your new chosen letter.

Section B consists of 5 questions where only an answer must be given. Each question is worth 2 marks. Write only your answer in the allocated space.

Section C consists of 5 questions where full working must be shown in the space provided. These questions are each worth 4 marks, and part marks may be awarded in this section only. Your final answer must be written in the allocated space.

3. Negative marking will not be applied.

4. Calculators (and other calculating devices) and geometry instruments are not allowed.

5. Figures are not necessarily drawn to scale.

6. Answer all questions on the answer sheet provided.

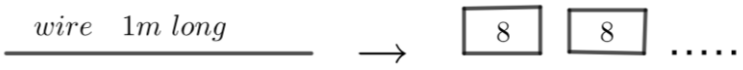
7. Paper may be used for rough working.

SECTION A

1. What is the value of: $\frac{2+0+2+3}{0{,}07}$?

A. 70 B. 10 C. 120 D. 100 E. 90

2. A piece of thin wire is 1 metre long. The wire is to be cut into lengths, and each length will be used to make a wire rectangle. Each rectangle made will have an area of $8cm^2$ and its length is twice its width.



What is the <u>largest</u> number of wire rectangles that can be made?

A. 10 B. 16 C. 13 D. 11 E. 8

3. Which fraction lies midway between $\frac{2}{5}$ and $\frac{3}{4}$?

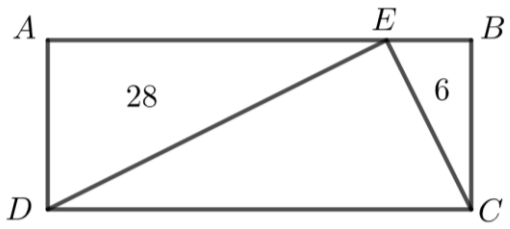
A. $\frac{5}{8}$ B. $\frac{23}{40}$ C. $\frac{9}{16}$ D. $\frac{11}{20}$ E. $\frac{19}{30}$

4. A man takes h hours to paint a house. He always works at the same rate. It begins to rain 1 hour after he started to paint the house, and he immediately stops painting.

What fraction of the house remained unpainted when he stopped?

A. $\frac{1}{h}$ B. $\frac{h+1}{h}$ C. $\frac{1}{h+1}$ D. $\frac{h-1}{h}$ E. $\frac{1}{h-1}$

5. In the figure, $ABCD$ is a rectangle with E lying on AB.
Area of $\Delta ADE = 28$ Area of $\Delta BCE = 6$



What is the area of $ABCD$?

A. 68 B. 82 C. 58 D. 64 E. 70

SECTION B

NB: Write only your answer in the allocated space.

6. In a school classroom, each desk has three chairs. Two girls and one boy are sitting at eight desks, while one girl and two boys are sitting at the remaining desks in the classroom. There are 33 pupils in total in the class.

How many girls are in the class?

7. I'm a 3-digit number:
- I'm divisible by 4
- I'm divisible by 9
- My unit digit is 1 more than my hundreds digit

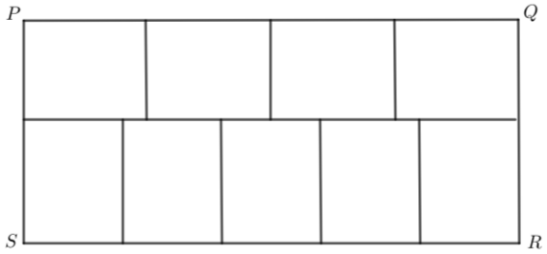
How many different 3-digit numbers could I be?

8. Amy and Josh choose the same natural number together. They both then begin counting up from the number in two's. (eg, if they both chose 11, then they would count 13, 15, 17, ….) When they stop counting, Josh has counted one more number than Amy. The sum of Amy's numbers is 252, and the sum of Josh's numbers is 301. Their sums include the number they chose to start with.
Which number did they both first choose?

9. Plastic digits $0-9$ are required to number 145 lockers in a school. (For example, locker 123 needs three plastic digits, 1, 2, and 3)

How many plastic digit $4's$ are needed in total?

10. In the figure, the large rectangle $PQRS$ is made up of nine identical smaller rectangles as shown.



What is the ratio $\frac{PS}{RS}$?

SECTION C

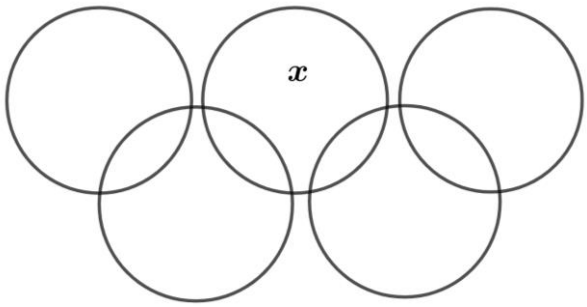
NB: Show all working and write your final answer in the allocated space. Part marks may be awarded.

11. What is the integer value of:

$$\frac{12+15+18+\ \ldots\ldots\ +300}{16+20+24+\ \ldots\ldots\ +400} \times 100\ ?$$ (Show all working)

12. Determine the sum of all 2-digit whole numbers which become a perfect square if the number is decreased by 11 and also if the number is increased by 21. (Show all working)

13. In the figure, 5 circles overlap to create 9 regions as shown. The numbers $1 - 9$ are written in each of the 9 regions such that the sum of the numbers in any full circle is exactly 11. All nine numbers are used exactly once.



Which number is written in the region marked x ? (Show all working)

14. Binary numbers consist only of 1's and 0's and may not begin with a 0. The following binary number continues in the same pattern and consists of 2023 digits:

101001000100000100000100 … … … (2023 digits)

How many 1's are there in this binary number? (Show all working)

15. A total of 2023 dogs and some cats are kept in 8 different kennels. There are as many dogs in each kennel as there are cats in all the other kennels together. (For example, if there were say 150 dogs in kennel 1, then there would be some cats in kennel 1 and 150 cats in total in kennels 2 – 8)

How many cats in total are kept in the 8 kennels? (Show all working)

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