BEYOND MATHS

PRIMARY SCHOOL CHALLENGE 2022

LEVEL 2 CHALLENGE
GRADE 6 AND 7 ROUND ONE

INSTRUCTIONS

1. The time allocated for this paper is 1 hour.
   Under no circumstances may extra time be given.

2. This paper consists of 20 multiple choice questions.
   Each question only has one correct answer.

3. Questions 1-15 are each worth 1 mark. Questions 16-20 are each worth 2 marks.

4. Negative marking will not be applied.

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

6. Figures are not drawn to scale.

7. Answer all questions on the answer sheet provided.

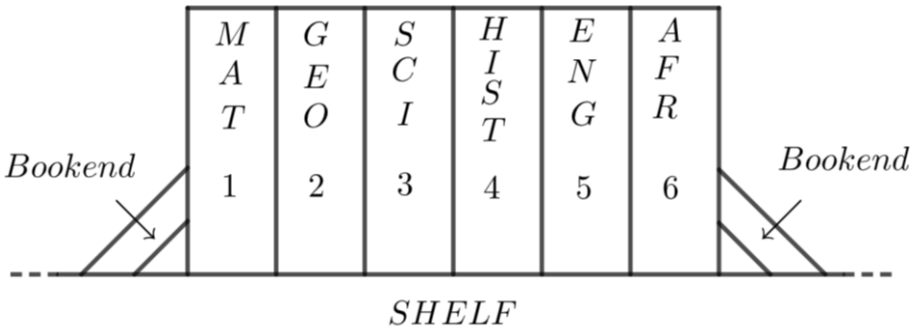
8. Circle the letter you have chosen as your answer in pen. Should you wish to change an answer, put a cross over the letter and then circle your new chosen letter.

9. Paper may be used for rough working.

1. What is the value of: $2022 - 202 \div \frac{1}{2}$?

(A) 1921 (B) 1816 (C) 1912 (D) 1800 (E) 1618

2. In the sketch, paperback books $1 - 6$ stand on a shelf in the usual manner. Books 1, 3, and 5 are $50mm$ thick. Books 2, 4, and 6 are $40mm$ thick. They are held vertically upright and touching one another by bookends.



A woodboring insect is living in Book 1. The insect eats its way through the books in a straight line perpendicular to the front and back book covers. If the insect eats in a straight line from the front cover of Book 1 to the back cover of Book 6, what distance in mm did the insect eat its way through?

(A) 230 (B) 190 (C) 270 (D) 180 (E) 130

3. What is the value of: $\frac{1}{4} \times 2022 + \frac{2}{4} \times 2022 - \frac{3}{4} \times 2022 + \frac{4}{4} \times 2022$?

(A) 1011 (B) 1920,5 (C) 2022 (D) 2020,5 (E) 3033

4. I am a 6-digit number. My first two digits are divisible by nine. My middle two digits are divisible by three. My last two digits are divisible by four. The sum of my digits is prime.

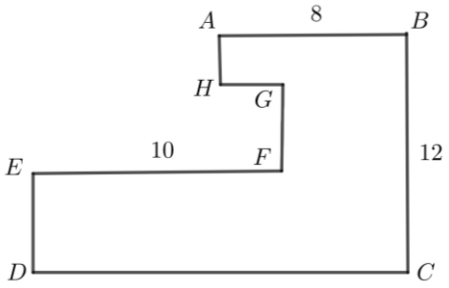
What number am I?

(A) 369944 (B) 341272 (C) 452312 (D) 721520 (E) 902144

5. The interior angles of a triangle are in the ratio $3 : 7 : 8$.
What is the value of the largest exterior angle of the triangle?

(A) 80° (B) 150° (C) 100° (D) 110° (E) 170°

6. In the figure $ABCDEFGH$ below, all sides intersect at right angles. $AB = 8$.
$BC = 12$. $EF = 10$.



What is the perimeter of figure $ABCDEFGH$?

(A) 70 (B) 48 (C) 60 (D) 52 (E) 50

7. A box contains 16 red balls, 18 green balls and 13 blue balls, each of identical shape and size. Blindfolded, you remove balls one-by-one from the box.

What is the smallest number of balls which must be removed such that you can be sure that you have at least seven balls of the same colour?

(A) 21 (B) 4 (C) 19 (D) 12 (E) 13

8. If $m = 3$ and $n = 5$, what is the value of:

$$m \times n \times 2 - \frac{1}{2}(m + n + 2) \ ?$$

(A) 35 (B) 26 (C) 15 (D) 20 (E) 25

9. What is the value of $\left(\frac{1}{2}+1\right)\times\left(\frac{1}{3}+1\right)\times\left(\frac{1}{4}+1\right)\times\left(\frac{1}{5}+1\right)\times$ ……

if the pattern continues for 2022 multiplications?

(A) 1012 (B) 2022,5 (C) 2022 (D) 1012,5 (E) 2024

10. Before water is added, a concrete mixture contains cement, stones, and sand, all in kilograms in the following ratio:

Cement : Stones : Sand $=$ 6 : 9 : 20

How many kilograms of cement are required to make 1120 kilograms of this concrete mixture?

(A) 600 (B) 192 (C) 96 (D) 112 (E) 200

11. Errol is writing a test. He answers 25 questions in one and a half hours. If he always worked at exactly the same rate, how many questions did he answer in 36 minutes?

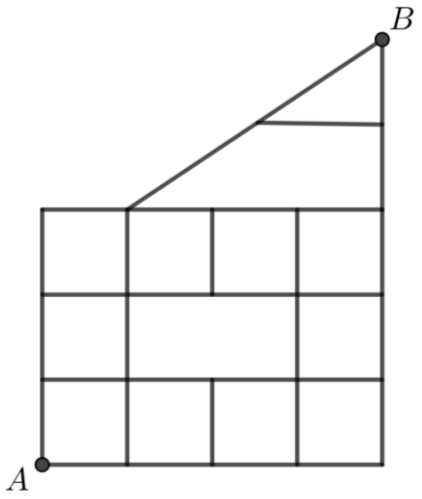
(A) 8 (B) 15 (C) 9 (D) 12 (E) 10

12. $\frac{a}{b}=7$ where a and b are 2-digit natural numbers.

What is the biggest sum $(a+b)$ if $a+b<100$?

(A) 96 (B) 112 (C) 88 (D) 84 (E) 108

13. In the diagram, Sarah is standing at A and wants to walk to B. She is only allowed to move to the right (→), up (↑), and diagonally up (↗).
How many different paths can she use in walking from A to B?



(A) 36 (B) 28 (C) 32 (D) 30 (E) 34

14. $180 \times P$ is a perfect cube, where P is a natural number.
What is the smallest possible value of P?

(A) 100 (B) 180 (C) 90 (D) 30 (E) 150

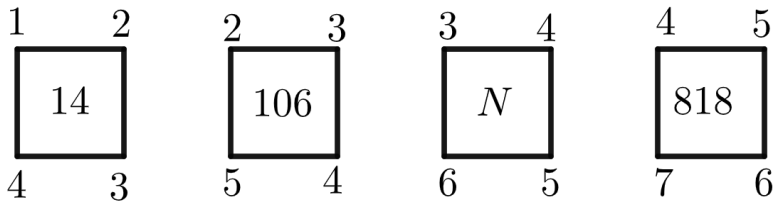
15. In the diagram, $a, b, c,$ and d are natural numbers.

$$\begin{array}{ccccc} \boxed{a} & \times & \boxed{b} & = & 48 \\ + & & \times & & \\ \boxed{c} & - & \boxed{d} & = & 4 \\ = 15 & & = 18 & & \end{array}$$

What is the value of $a + b + c + d$?

(A) 28 (B) 24 (C) 31 (D) 32 (E) 20

16. In the following pattern, what is the value of the natural number N?



(A) 342 (B) 212 (C) 120 (D) 409 (E) 614

17. Objects A, B, and C have different weights. Different numbers of these weights are shown on the see-saws below. Each figure shows a balanced see-saw, that is, there is exactly the same amount of weight on each end.

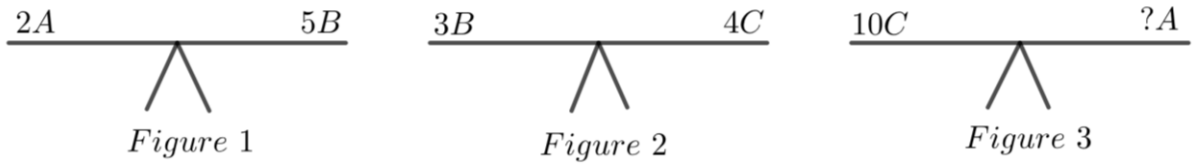


Figure 1 *Figure 2* *Figure 3*

How many objects of weight A are in *Figure* 3 ? (What is the numerical value of the "?" in front of the A in *Figure* 3 ?)

(A) 4 (B) 3 (C) 6 (D) 2 (E) 5

18. Mpilo begins counting down by 7's from 1400 (1400; 1393; 1386 .....), while Phumla begins counting up by 8's from 500 (500; 508; 516; .....). If they both start counting at exactly the same time, and both count at exactly the same rate, which number will they both say at exactly the same time?

(A) 980 (B) 1000 (C) 910 (D) 870 (E) 1010

19. In the equations below, what is the value of $\triangle$?

$$\boxplus + \boxplus + \boxplus = 18$$
$$\oplus - (\boxplus + \boxplus) = 2$$
$$\triangle + \triangle + \oplus = 18$$

(A) 1 (B) 2 (C) 3 (D) 4 (E) 5

20. In the number below, M and N are each single digits $0 - 9$. The digits of M and N may be the same.

If the number is divisible by 36, how many different pairs of digits MN are possible?

$$497512683MN$$

(A) 6 (B) 4 (C) 2 (D) 5 (E) 3

********** END **********