

# HORIZON MATHEMATICS COMPETITION

## HMC 2008 FIRST ROUND

NAME, SURNAME: .....

### INSTRUCTIONS

- Do not turn over this booklet until told to do so.
- This examination paper consists of 20 multiple choice questions of mathematics, logical deduction, and analytical reasoning. Each question is followed by answers marked a, b, c, d and e. Only one of these is correct.
- The final answers must be entered in the correct circle on the ANSWER SHEET which is supplied separately.
- The correct answers will be counted; there is no penalty for the incorrect answers.
- Exam duration is 60 minutes and no extra time will be given.
- Calculators or any other computing devices are NOT allowed.
- Rough paper, pen, pencil, and rubber are permitted.
- Start when the invigilator tells you to do so. Good luck!

1.  $1 + 3 - 4 - 6 + 5 + 7 =$

- A) 5
- B) 6
- C) 7
- D) 8
- E) 9



2.  $7 \times 5 - 4 \times 8 + 2 =$

- A) 70
- B) 69
- C) 58
- D) 5
- E) 2

3.  $\frac{3}{4} - \frac{2}{3} =$

- A) 1
- B)  $\frac{1}{2}$
- C)  $\frac{1}{3}$
- D)  $\frac{1}{6}$
- E)  $\frac{1}{12}$



4. If the operation  $\otimes$ , is defined as  $a \otimes b = \frac{a}{b} + b$ , find the value of  $24 \otimes 3$
- A) 8  
B) 11  
C) 16  
D) 21  
E) 32
5. Three identical squares form a rectangle which has an area of  $147 \text{ cm}^2$ . The perimeter of this rectangle is
- A) 21  
B) 70  
C) 49  
D) 35  
E) 56
6. In a class 10 students collect stamps, 15 students collect postcards. 4 students collect both, but 5 students collect neither. How many students are there in the class?
- A) 24  
B) 25  
C) 26  
D) 34  
E) None of the above
7. Out of the numbers 3, 5, 8, 9, 10 we left one number out and calculated the average of the rest. We got 8. Which number did we leave out?
- A) 3  
B) 5  
C) 8  
D) 9  
E) 10



8. Smarty is thinking: what could the greatest difference be between such two 2-digit numbers that differ only in the order of their digits?

- A) 89
- B) 77
- C) 81
- D) 90
- E) 72

9. 51, 26, 40, 16, 37, ...

In this sequence the next element can be created by adding the squares of the digits of the last number. (For example: the number following 16 is:

$$1^2 + 6^2 = 1 + 36 = 37$$

What is the 9th element of this sequence?

- A) 42
- B) 89
- C) 121
- D) 145
- E) 58

10. If six more than three times a number is 51, which of the following is this number?

- A) 11
- B) 13
- C) 15
- D) 19
- E) 23



11. In a warehouse there are two identical barrels: one of them is full of oil, the other one is exactly half way. Their masses are 80 kg and 50 kg. What is the mass of an empty barrel?

- A) 10 kg
- B) 15 kg
- C) 20 kg
- D) 25kg
- E) 30 kg



**12. On the same day in the summer of 2008 Sihle is going to be 2008 days old and his father is going to be 2008 weeks old. How old was his father when Sihle was born?**

- A) 30
- B) 31
- C) 32
- D) 33
- E) 34

**13. If it is 9 am now, what time will it be 2008 hours from now?**

- A) 1 am
- B) 7 am
- C) 1 pm
- D) 7 pm
- E) None of the above



**14. If a brick is 2 kilograms and a half brick, then how many kilograms are 2 bricks?**

- A) 2 kg
- B) 4 kg
- C) 6 kg
- D) 8 kg
- E) 12 kg

**15. 5 new suitcases and an envelope with the keys to them in it arrived to a bag shop. Every key opens only one suitcase. At least how many tries is necessary to find the right key to every suitcase?**

- A) 5
- B) 10
- C) 15
- D) 25
- E) None of the above



16. Three people, A, B, and C, are talking.

A says: "B is lying."

B says: "C is lying."

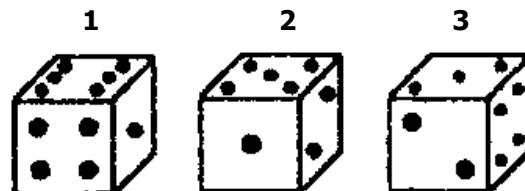
C says: "A and B are lying."

Who says the truth?

- A) Only A
- B) Only B
- C) Only C
- D) A and C
- E) A and B

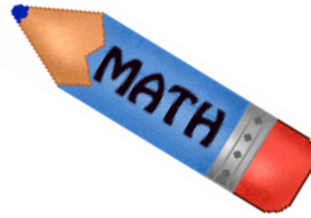
17. The following pictures were taken of a cube in three different positions. How many points are there on the bottom side of the cube in the third position?

- A) 1
- B) 3
- C) 4
- D) 5
- E) 6



18. Nkanyiso gets R11 for every R15 that Stanley gets. If they have R390 altogether, how much money does Stanley have more than Nkanyiso?

- A) 40
- B) 60
- C) 75
- D) 80
- E) 120







19. The 2-headed dragons and the 3-headed dragons have a meeting. There are a total of 13 dragons present with a total of 35 heads. How many 3-headed dragons are there at the meeting?

- A) 4
- B) 6
- C) 7
- D) 9
- E) 11

20. In a snowman making competition the children made 30 snowmen. The heads of the snowmen followed a particular pattern shown on the diagram below. How does the head of the last snowman look like?



- A) 
- B) 
- C) 
- D) 
- E) 