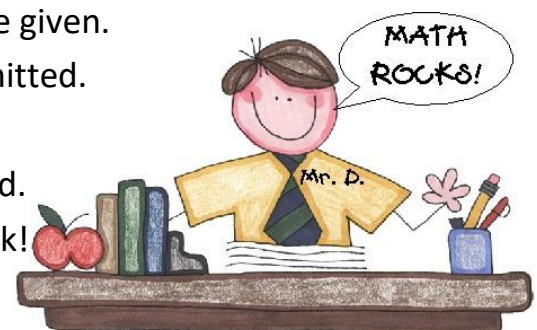


# HMC 2016 - SECOND ROUND

## BOOKLET - **A**

### INSTRUCTIONS

- Before you start, make sure that your details are filled in accurately.
- Do not open this booklet until told to do so.
- This examination paper consists of 30 multiple choice questions. Each question is followed by answers marked A, B, C, D and E. Only one of them is correct.
- The final answers must be entered in the correct box on the ANSWER SHEET which is supplied separately.
- Each correct answer is worth:
  - 4 marks in Part 1 (Questions from 1 to 10)**
  - 5 marks in Part 2 (Questions from 11 to 20)**
  - 6 marks in Part 3 (Questions from 21 to 30)**
- There is a penalty, **-1 mark**, for every incorrect answer.
- Exam duration is 75 minutes and no extra time will be given.
- Calculators and geometric instruments are NOT permitted.
- Diagrams are NOT necessarily drawn to scale.
- Rough paper, pen, pencil, and an eraser are permitted.
- Start when the invigilator tells you to do so. Good luck!



# PART – 1



4 marks each

1)  $5^2 + (5 \times 2 + 2)^2 = ?$

- A) 925                      B)  $17^2$                       C) 169                      D) 106                      E)  $9^2$

2)  $\frac{2}{5} \times \frac{5}{3} + \frac{1}{2} - \frac{5}{6} = ?$

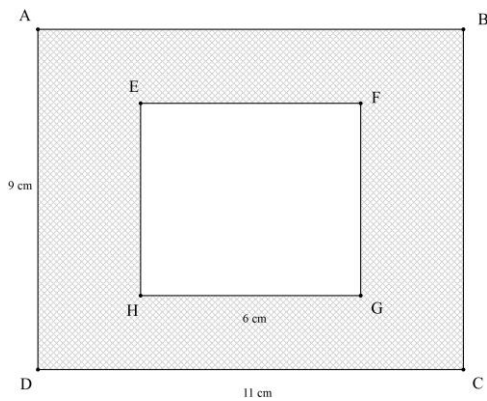
- A)  $\frac{7}{6}$                       B) 1                      C)  $\frac{5}{6}$                       D)  $\frac{2}{3}$                       E)  $\frac{1}{3}$

3)  $\sqrt{13 + \sqrt{7 + \sqrt{4}}} = ?$

- A)  $\sqrt{22}$                       B) 4                      C)  $\sqrt{13}$                       D) 2                      E) 1

4) In the given diagram, square EFGH with HG=6cm is inside the rectangle ABCD with AD=9cm and CD=11cm. What is the area of the shaded region?

- A) 66                      B) 45                      C) 65                      D) 63                      E) 55

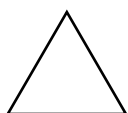


5) If 12% of candies in a basket is 36, then the total number of all the candies is:

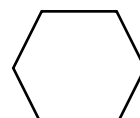
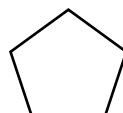
- A) 150                      B) 200                      C) 300                      D) 250                      E) 360

6) Find the missing number in the pattern;      5      9      17      33      ?      129

- A) 63                      B) 64                      C) 75                      D) 72                      E) 65



1



7)

12

20

30

?

There is a relationship between the shapes and the numbers. Find the value of  $x$ .

A) 35

B) 42

C) 45

D) 48

E) 54

8) Jayson eats 5 slices of bread in a day. If there are 15 slices in each loaf of bread, how many loaves of bread will he eat in 30 days?

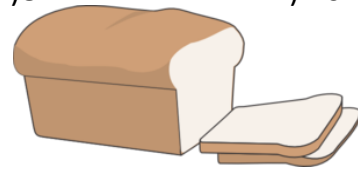
A) 5

B) 6

C) 20

D) 8

E) 10



9) Last Sunday, Alfred received several visitors. When Bongani arrived, Chikoni was already there. Damien and Eric arrived together. Fredrick opened the door for George and George opened the door for Eric. Chikoni arrived after Eric.

Who was the last one to arrive?

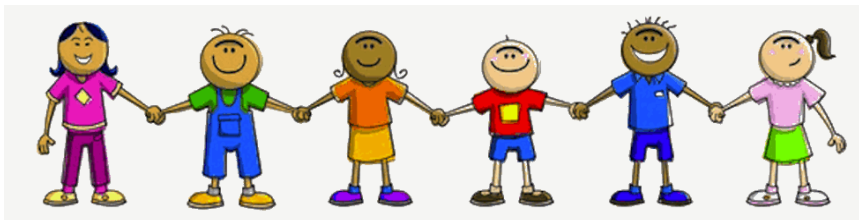
A) Damien

B) Bongani

C) Fredrick

D) Chikoni

E) Eric



10) When Boris was born, Kevin was 8 years old. Today the sum of their ages is 20. How old is Boris now?

A) 6

B) 7

C) 8

D) 9

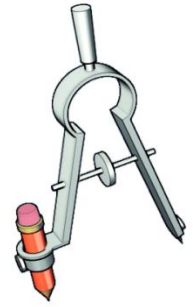
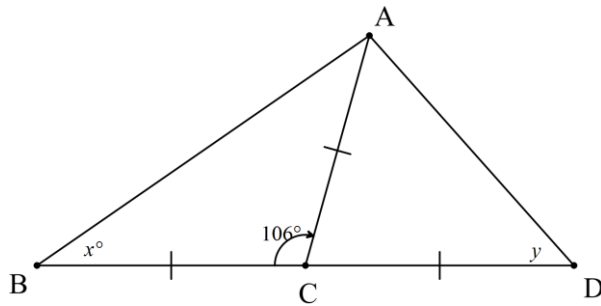
E) 10



# PART – 2

5 marks each

11) In triangle ABC, the value of  $x + y$  is



- A) 106                      B) 76                      C) 53                      D) 90                      E) 166

12)  $3 + [5 - 1 \times 3] + (8 \div 2) = ?$

- A) 9                      B) 25                      C) 31                      D) 19                      E) 1

13) Which one is the correct order of the following numbers?

$$a = 0,025 \quad b = \frac{1}{2} + \frac{1}{4} \quad c = \frac{5}{16} \quad d = 4 \times 0,25$$

- A)  $a < b < c < d$       B)  $a < c < d < b$       C)  $a < c < b = d$       D)  $a < b = d < c$       E)  $a < c < b < d$

$$14) \frac{x}{1 + \frac{1}{1 - \frac{1}{2}}} = 3$$

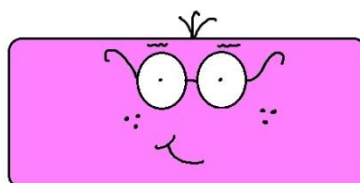


According to the given equation, what is the value of  $x$ ?

- A) 3                      B) 8                      C) 9                      D) 6                      E) 4

15) If the area of a rectangle is  $30 \text{ cm}^2$ , what is the smallest value of the perimeter of the rectangle? (The dimensions are in integers)

- A) 31 cm                      B) 13 cm                      C) 11 cm                      D) 22 cm                      E) 26 cm

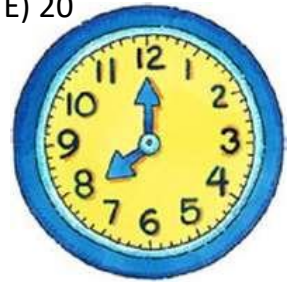


16) The sum of a number and the half of three times of this number is 75. What is the value of the number?

- A) 40                      B) 36                      C) 30                      D) 20                      E) 28

17) What is the measurement of the angle formed by the hands of a clock at 4:40pm?

- A) 105                      B) 100                      C) 90                      D) 80                      E) 20



18) How many natural numbers from 1 to 200 (included), do **not** contain the digit 1?

- A) 81                      B) 90                      C) 101                      D) 99                      E) 109

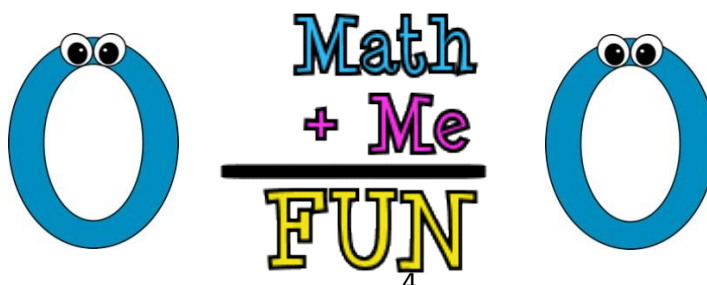
19) A square piece of paper is folded in half and then cut into two rectangles along the fold. The perimeter of each of the two rectangles is 18 cm. What is the perimeter of the original square?

- A) 24                      B) 18                      C) 20                      D) 36                      E) 28



20) A boy wants to make the school basketball team. He attends practice on Monday, Tuesday, Wednesday, Thursday and Friday. Last week at each practice, he made twice as many free throws as he had made at the previous practice. At his fifth practice he made 48 free throws. How many total free throws did the child make during the week?

- A) 118                      B) 96                      C) 64                      D) 93                      E) 63



## PART – 3

6 marks each

21) In a certain room, all children sit on either a stool or a chair. On each stool and chair there is a child. Each stool has 3 legs, each chair has 4 legs, and each child has 2 legs. Altogether, there are 79 legs. What is the maximum number of chairs?

- A) 7                      B) 9                      C) 17                      D) 13                      E) 11

22) The positive integers greater than 1 are arranged in 5 columns as shown below:

	2	3	4	5
9	8	7	6	
	10	11	12	13
17	16	15	14	
⋮	⋮	⋮	⋮	⋮



In which column will 2016 be located?

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

23) A whole number is called *decreasing* if each digit of the number is less than the digit to its left. For example 8540 is a decreasing four-digit number. How many decreasing numbers are there between 100 and 600?

- A) 23                      B) 19                      C) 20                      D) 17                      E) 15

24) On a piece of paper there is a three-digit number ending with a 2. If that 2 is removed and placed at the beginning of the number, the result is a three-digit number which is 36 less than the original. What is the sum of the digits of the original number?

- A) 11                      B) 12                      C) 13                      D) 17                      E) 10

25) What is the last digit of the number  $2016 + 2^{2016}$  ?

- A) 2                      B) 4                      C) 6                      D) 8                      E) 0



26)  $\frac{1}{4} < \frac{x}{10} < \frac{7}{8}$

According to the given expression, which one of the following **cannot** be the value of  $x$ ?

- A) 2                      B) 3                      C) 6                      D) 7                      E) 8



27) Maria has two apples, two bananas, and one mango. From Monday to Friday, she will eat one on each day. In how many different ways can she do this?

- A) 5                      B) 20                      C) 24                      D) 25                      E) 30



28) Anna climbed up the stairs 3 steps at a time and climbed down the same stairs 4 steps at a time. She had 12 more jumps when she climbed up. How many steps are there in the stairs?

- A) 124                      B) 120                      C) 136                      D) 144                      E) 153

29) The distance between city A and city B is 720 km. The speed of a car travelling from city A to city B is 100 km/h and the speed of another car travelling from city B to city A is 80 km/h. How far are they away from the city B when they meet each other?

- A) 400                      B) 300                      C) 320                      D) 420                      E) 360



30) A positive integer whose digits are the same when read forwards or backwards is called a palindrome. For example, 4774 is a palindrome. How many integers between 2016 and 3000 are palindromes?

- A) more than 10      B) 10                      C) 0                      D) 9                      E) 8

THE END



## NATIONAL HMC PARTICIPANTS

2004	800 Entrants	2010	16800 Entrants
2006	4500 Entrants	2011	17300 Entrants
2007	6000 Entrants	2012	18500 Entrants
2008	9500 Entrants	2013	23278 Entrants
2009	13250 Entrants	2014	23650 Entrants

### HMC 2015

33750 National Participants where 6500 entered in Johannesburg  
215 Learners invited to the PRIZE GIVING ceremony  
as TOP LEARNERS of Johannesburg 102 Females; 113 Males;  
165 in Grade 7; 47 in Grade 6; 3 in Grade 5

Organized by

Star College Johannesburg  
(Horizon International High School)

Nizamiye Schools Johannesburg

Star College Cape Town

Star College Durban

Star College Pretoria

Star Academy Polokwane

Nizamiye Al-Azhar Port Elizabeth



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