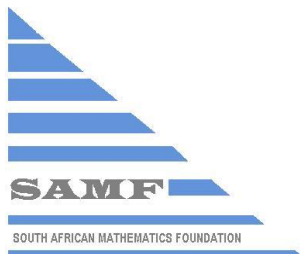




SOUTH AFRICAN MATHEMATICS OLYMPIAD



Organised by the
SOUTH AFRICAN MATHEMATICS FOUNDATION

2012 FIRST ROUND SENIOR SECTION: GRADES 10, 11 AND 12

19 March 2012 Time: 60 minutes Number of questions: 20

Instructions

1. This is a multiple choice question paper. Each question is followed by answers marked A, B, C, D and E. Only one of these is correct.
2. Scoring rules:
 - 2.1. Each correct answer is worth 5 marks.
 - 2.2. There is no penalty for an incorrect answer or any unanswered question.
3. You must use an HB pencil. Rough work paper, a ruler and an eraser are permitted.
Calculators and geometry instruments are not permitted.
4. Figures are not necessarily drawn to scale.
5. Indicate your answers on the sheet provided.
6. Start when the invigilator tells you to do so.
7. Answers and solutions will be available at www.samf.ac.za

***Do not turn the page until you are told to do so.
Draai die boekie om vir die Afrikaanse vraestel.***

PRIVATE BAG X173, PRETORIA, 0001
TEL: (012) 392-9323 Email: ellie@samf.ac.za

Organisations involved: AMESA, SA Mathematical Society,
SA Akademie vir Wetenskap en Kuns



PRACTICE EXAMPLES

1. As a decimal number 6.28% is equal to

- (A) 0.0628 (B) 0.628 (C) 6.28 (D) 62.8 (E) 628

2. The value of $1 + \frac{1}{3 + \frac{1}{2}}$ is

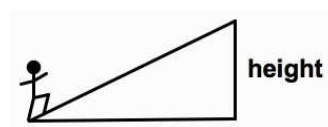
- (A) $\frac{6}{5}$ (B) $\frac{7}{6}$ (C) $\frac{9}{2}$ (D) $\frac{6}{7}$ (E) $\frac{9}{7}$

3. The tens digit of the product $1 \times 2 \times 3 \times \cdots \times 98 \times 99$ is

- (A) 0 (B) 1 (C) 2 (D) 4 (E) 9

**PLEASE DO NOT TURN THE PAGE UNTIL YOU ARE
TOLD TO DO SO**

7. A mountain path has a gradient of 3 : 4. If I walk 15 m up the path, then how many metres higher am I than at my original position?



(A) 4 (B) 6 (C) 9 (D) 10 (E) 15

8. If your watch loses 5 minutes each hour and you set the time correctly at 07:00, what is the actual time when your watch shows later that morning that it is 09:45?

(A) 09:55 (B) 10:00 (C) 10:05 (D) 10:10 (E) 10:15

9. A pack of 52 cards is dealt out to 10 people seated around a circular table in such a way that the first person gets the 1st card, the fourth person gets the 2nd card, the seventh person gets the 3rd card, the tenth person gets the 4th card, the third person gets the 5th card and so on. Which person gets the last card?

(A) 2nd (B) 4th (C) 5th (D) 6th (E) 7th

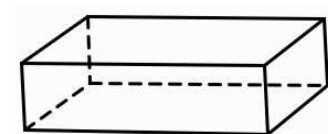
10. A straight line passes through the points (2,3) and (4,7). Which one of the following points is also on the line?

(A) (0, 2) (B) (1, 2) (C) (2, 4) (D) (3, 5) (E) (4, 5)

11. The value of $1 + 2 + 3 - 4 + 5 + 6 + 7 - 8 + \dots + 97 + 98 + 99 - 100$ is

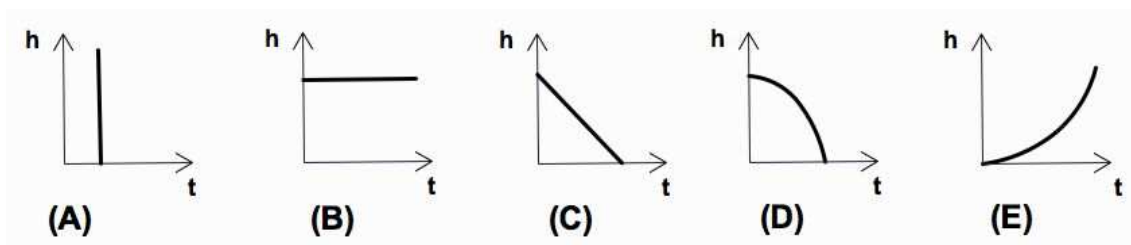
(A) 4010 (B) 5050 (C) 3050 (D) 2450 (E) 1206

12. How many pairs of parallel edges are there in the rectangular box shown?



(A) 18 (B) 12 (C) 24 (D) 8 (E) 16

13. A ball is dropped from the roof of a tall building. Which one of the following graphs best represents the height h of the ball above the ground with respect to time t ?



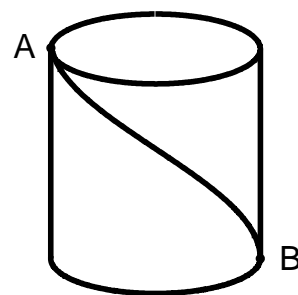
14. In a set of numbers there are 5 even numbers and 4 odd numbers. If 2 numbers are chosen at random from the set, without replacement, then the probability that the sum of these two numbers is even is

- (A) $\frac{4}{9}$ (B) $\frac{1}{3}$ (C) $\frac{2}{9}$ (D) $\frac{2}{3}$ (E) $\frac{5}{9}$

15. The current Olympic record for the 100 m sprint is 9.69 s and held by Usain Bolt from Jamaica. How fast is this approximately in km/h?

- (A) 21 (B) 25 (C) 30 (D) 37 (E) 43

16. The cylinder alongside has a radius of 4 cm and a height of 8 cm. André, the ant, walks along the shortest path on the curved surface of the cylinder from point A at the top to point B , which is at the bottom and on the opposite side of the cylinder. The distance in cm that André travels, is



- (A) $4(\pi + 2)$ (B) $4\sqrt{\pi^2 + 4}$ (C) $8\sqrt{2}$ (D) 16 (E) $4\pi + 8$

