



HORIZON
MATHEMATICS
COMPETITION

2006

SECOND ROUND

Organized by the
Horizon High School (Johannesburg)
Star International High School (Cape Town)
Star College (Durban)
Of

HORIZON EDUCATIONAL TRUST

INSTRUCTIONS

- Do not look at the questions until you are told to do so.
- Time allowed: **75 minutes**
- You may use paper for rough work. Calculators are **not** allowed.
- This is a multiple-choice test. Each question is followed by five possible answers marked **A, B, C, D,** and **E**. Only one of them is correct. When you have decided on your choice, fill in the appropriate box containing the letter on your answer sheet for that question.
- Diagrams are *not* drawn to scale. They are intended as aids only.

SCORING

- Each correct answer is worth 5 marks for the questions 1 to 15 and 6 marks for the questions 16 to 30.
- There is a penalty for an incorrect answer. Each incorrect answer loses 2 marks.

PART I

1. Nitesh uses an average of 20 litres of petrol per week. He pays R 5, 50 per litre. Of the following, the closest estimate of the yearly petrol bill is

- A) R5000 B) R5400 C) R5750 D) R6000 E) R6500

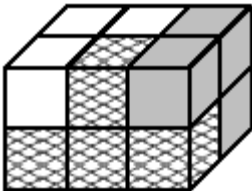
2. Clement cut a sheet of paper into 10 pieces. Then he took one piece and cut it again into 10 pieces. He then repeated this three more times. How many pieces of paper did he have after the last cutting?

- A) 36 B) 40 C) 46 D) 50 E) 56

3 . A certain charity organization decided to buy 2006 notebooks. The warehouse was selling boxes of 24 notebooks. What is the least number of boxes that the warehouse should buy in order to have 2006 notebooks, and by what number will the number of 2006 notebooks be exceeded?

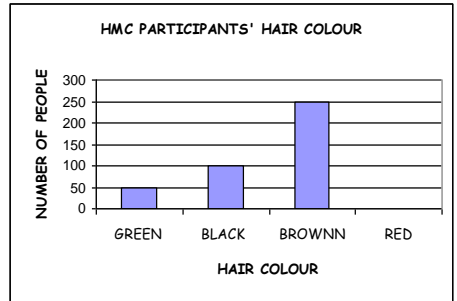
- | | |
|---------------------------|---------------------------|
| A) 83 boxes, 10 notebooks | B) 84 boxes, 10 notebooks |
| C) 83 boxes, 14 notebooks | D) 84 boxes, 16 notebooks |
| E) 84 boxes, 14 notebooks | |

4. A rectangular prism was made out of three blocks, each consisting of four cubes (see the picture). Which of the blocks below has the same shape as the white block?



- A)  B)  C)  D)  E) 

5. The bar graph shows the hair colours of the participants of **Horizon Maths Competition**. The bar corresponding to red heads has been accidentally removed. If 50% of the participants have brown hair, how many of the participants have red hair?



- A) 75 B) 100 C) 125 D) 150 E) 175

6. What is the remainder when dividing the sum:
 $2001 + 2002 + 2003 + 2004 + 2005$ by 2004?

- A) 1 B) 2001 C) 2002 D) 2003 E) 1999

7. I wear my headphones only cloudy days. The day after each cloudy day is sunny day. At most how many times do I wear my headphones in a week?



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

8. Uncle Bookworm eats three books a week. Aunt Bookworm eats three books every month. In a year, how many books does uncle eat more than aunt does?

- A) 100 B) 110 C) 120 D) 130 E) 60



9. In each of the little squares Thabile places one of the digits: 1, 2, and 3, 4. she makes sure that in each row and each column each of these numbers is placed. In the figure below, you can see the way she started. In how many ways can she fill the square marked with an x?

1		x	
4	1		
	3		
	2		

- A) 1 B) 2 C) 3 D) 4 E) None

10. Alfonso the ostrich was training for the Head in the Sand Competition in the Animal Olympiad. He put his head in the sand at 8:15 on Monday morning and reached his new personal record by keeping it underground for 98 hours and 56 minutes. When did Alfonso pull his head out of the sand?

- A) On Thursday at 5:19 A.M.
 B) On Thursday at 5:41 A.M.
 C) On Thursday at 11:11 A.M.
 D) On Friday at 5:19 A.M.
 E) On Friday at 11:11 A.M



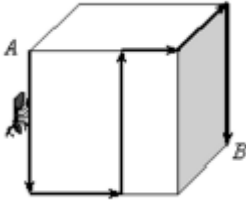
11. $5 + 6 \times 7 - 8 \div 4 = ?$

- A) 43 B) 34.5 C) 5 D) 5.5 E) 45

12. How many hours are there in half of a third part of a quarter of a day?

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

13. The edge of the cube is 10 cm long. The ant moves on the cube surface from point A to point B along the path shown in the figure. Find the length of the ant's path.



- A) 60cm B) 50cm C) 48cm D) 40cm E) None of these

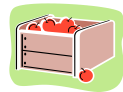
14. One morning, a snail decides to climb to a wall 10 metres in height. During the day, the snail can climb 3 metres but falls 2 metres at night. How many days will it take for the snail to climb the wall?



- A) 7 B) 8 C) 9 D) 10 E) None of these

15. Five merchants sell apples at different prices. Which is the best buy?

- A) 2.5 kg for R5 B) 0.5 kg for R1.5 C) 5 kg for R20
 D) 3 kg for R7.5 E) 1 kg for R5



16. A pyramid consists of seven sides. How many edges does the pyramid have?

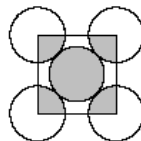
- A) 8 B) 9 C) 12 D) 18 E) 21



17. You count from 1 to 100 and you clap while saying the multiples of the number 3 and the numbers that are not the multiples of three but have 3 as the last digit. How many times will you clap your hands?

- A) 30 B) 33 C) 36 D) 39 E) 43

18. In the diagram, five circles have the same radii, and they touch as shown. The small square joins the centres of the four outer circles. What is the ratio of the shaded area of all the circles to the non-shaded area of all the circles?



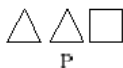
- A) 2: 3 B) 1:3 C) 2:5 D) 5:4 E) 1:4

19. Bafana the baby got immunized on the one millionth second of year 2006. That happened on



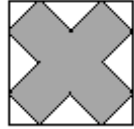
- A) 11th January B) 12th January C) 1st February
D) 2nd February E) 3rd February

20. The symbols P, Q, R, S indicate the total weight of the figures drawn above them (see the picture). It is known that any two figures of the same shape have the same weight. If $P < Q < R$ then:



- A) $P < S < Q$ B) $Q < S < R$ C) $S < P$ D) $R < S$ E) $R = S$

21. A picture shows a square and a shaded dodecagon. The sides of the dodecagon have the same length and are perpendicular to each other. The perimeter of the dodecagon is 36. What is the area of the square?

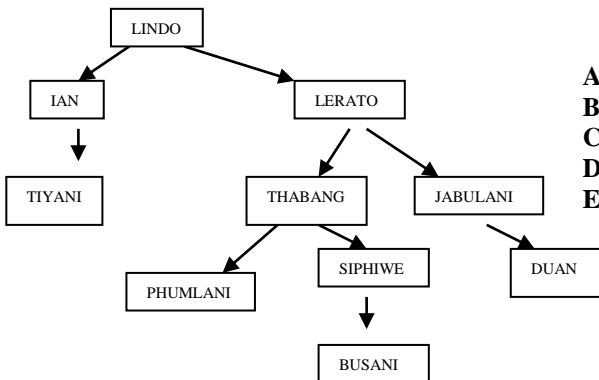


- A) 48 B) 72 C) 108 D) 115.2 E) 144

22. A group of classmates was planning a trip. If each of them paid R14, then they would be R4 short to pay for the trip. On the other hand, if each of them paid R16, they would have R6 more than they needed. How much should each of the classmates contribute so they collect the exact amount needed for the trip?

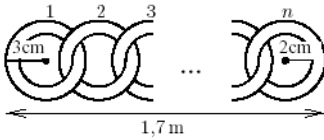
- A) R14.40 B) R14.60 C) R14.80 D) R15.00 E) R15.20

23. Busani created a genealogical tree of the men in his family. The arrows go from a father to a son. What was the name of the son of the brother of the grandfather of Busani's father's brother?



- A) Thabang
 B) Duan
 C) Lerato
 D) Tiyani
 E) The other answer

24. Rings with dimensions shown in the figure were linked together, forming 1.7m long chain. How many rings were used to create the chain?



- A) 30 B) 21 C) 42 D) 85 E) 17

25. Tumelo has 42 identical cubical blocks, each one with an edge of 1 cm. From all of these blocks, he built a rectangular prism with a base perimeter equal to 18 cm. What is the height of the prism which he built?

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

26. A test consists of 20 questions. For a correct answer a student gets 7 points, for every incorrect answer this student loses 2 points, and for no answers he gets 0 points. Andrzej received 87 points on his test. How many questions did he not answer?

- A) 2 B) C) 4 D) 5 E) 6

27. Each boy: Thabo, Thato, Thami and Thabiso has exactly one of four animals: a cat, a dog, a gold fish and a canary. Thato has an animal with fur, Thabiso has an animal with four legs, Thami has a bird and Thabo and Thato don't like cats. Which of the statements below is not true?

- A) Thabiso has a dog B) Thami has a canary C) Thabo has a gold fish
D) Thabiso has a cat E) Thato has a dog

28. Statistics show that 10% of smokers get lung cancer, and 90% of lung cancer patients are smokers. If 20% of the population smokes, then the percentage of the population having lung cancer is

- A) $\frac{9}{5}$ B) 2 C) 3 D) 9 E) $\frac{20}{9}$



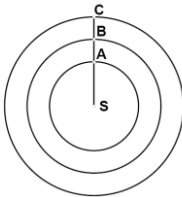
29. The combined capacity of a bottle and a glass is equal to the capacity of a pitcher. The capacity of a bottle is equal to the combined capacity of a glass and a mug. The combined capacity of three mugs is equal to the combined capacity of two pitchers. How many glasses altogether have the capacity of one mug?



- A) 3 B) 4 C) 5 D) 6 E) 7



30. Three planets are in straight line as in the diagram below. Planet A makes a complete revolution around the Sun S in two years.



Planet B makes its revolution in four years and planet C in 6 years. What is the least number of years before all three planets will once again be on the same line.

- A) 15 B) 14 C) 13 D) 12 E) 11