SOUTH AFRICAN MATHEMATICS OLYMPIAD

Organised by the
SOUTH AFRICAN MATHEMATICS FOUNDATION

2012 FIRST ROUND
JUNIOR SECTION: GRADE 8

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. *The centre page is an information and formula sheet. Please tear out the page for your own use.*
7. *Start when the invigilator tells you to do so.*
8. *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.

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

1. Which of the following is the largest?

(A) 2,010 (B) 2,001 (C) 2,100 (D) 2,011 (E) 2,101

2. 2,012 + 201,2 =

(A) 203,32 (B) 203,032 (C) 201,32 (D) 203,212 (E) 202,312

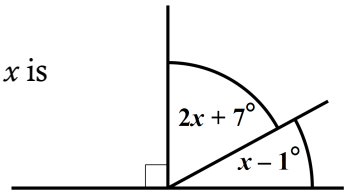
3. $2^3 + 3^2$ is equal to

(A) 17 (B) 31 (C) 15 (D) 13 (E) 25

4. The number of positive even factors of 18 is

(A) 0 (B) 1 (C) 2 (D) 3 (E) 6

5. The value of x is



(A) 28° (B) 30° (C) 34° (D) 38° (E) 40°

6. A shop promoting soap bars encourages you to Buy Three Get Another One Free! If you want 23 bars, what is the least number you have to pay for?

(A) 17 (B) 18 (C) 19 (D) 20 (E) 21

7. If the square roots of the natural numbers from 1 to 200 are written down, how many of them are whole numbers?

(A) 10 (B) 11 (C) 12 (D) 13 (E) 14

8. The number 41x356 is divisible by 9. The digit x is

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

9. South America and Africa are drifting apart at 30 cm per century. Approximately how many millimetres is that per week?

(A) 60 (B) 30 (C) 6 (D) 0,6 (E) 0,06

10. Two primes add up to 36. Their product is not

(A) 323 (B) 299 (C) 155 (D) 203 (E) 161

11. John says a number out loud; Jane doubles it but Rebecca multiplies it by 5 and then subtracts 6. Both girls get the same result. The number John mentioned was

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

12. If n* means $2n + 1$, then the value of (3*)* is

(A) 9 (B) 11 (C) 13 (D) 15 (E) 17

13. A racing cyclist circles the cycling track every 2 minutes and 40 seconds. How many full laps will he complete in four hours at the same rate?

(A) 80 (B) 85 (C) 90 (D) 95 (E) 100

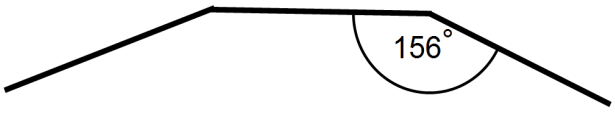
14. My friend and I both bought the same thing at a shop. We both paid using R5 and R2 coins only, but each of us paid with a different number of each of the coins, and each of us used R5-coins as well as R2-coins. The least possible price of the item we bought is

(A) R 11 (B) R 13 (C) R 15 (D) R 17 (E) R 23

15. If M and N are natural numbers, and if only one of the following sentences is true, which is it?

(A) M is odd
(B) N^2 is even
(C) M – N is odd
(D) N is odd
(E) M, N have no common factors other than 1

16. The diagram shows part of a regular polygon, and the size of one of the interior angles. The number of sides of the polygon is

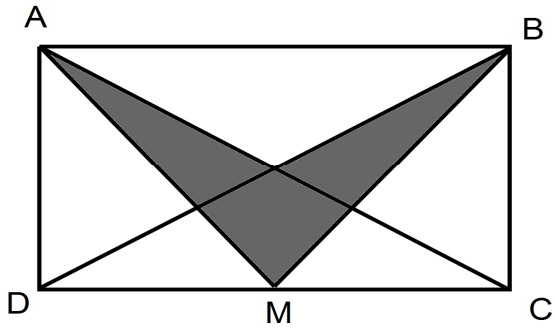


(A) 8 (B) 9 (C) 10 (D) 12 (E) 15

17. Anne is now three times as old as she was three years before she was half as old as she is now. Anne's age now is

(A) 9 (B) 12 (C) 15 (D) 16 (E) 18

18. M is the midpoint of the side DC of rectangle ABCD. The fraction of the rectangle that is shaded is



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

19. How many three-digit **odd** numbers become bigger when their digits are reversed?

(A) 120 (B) 145 (C) 200 (D) 260 (E) 360

20. The perfect squares are written as a sequence of digits 149162536….. The 85^{th} digit in this sequence is

(A) 4 (B) 5 (C) 6 (D) 7 (E) 8
