SOUTHERN AFRICAN JUNIOR MATHEMATICS OLYMPIAD

FEMSISA MATHEMATICS OLYMPIAD

(SAJMO)

GRADE EIGHT

ROUND ONE

DATE: 3-10 JUNE 2011

TIME: 90 MINUTES

Instructions:

1. This booklet has 20 multiple choice questions.
2. Use the answer sheet provided.

   Circle the letter corresponding to your answer.
3. All working details must be done in the space provided.
3. Calculators are not permitted..
4. Diagrams are not necessarily drawn to scale.
5. The first 15 problems carry one mark each and the next 5 carry 2 marks each.

   In order to qualify for the second round you need 7 out of 25 marks.
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7. Read the questions carefully before answering.
8. Visit the website: www.mathematics-forall.com

Grade Eight Mathematics Olympiad 2011

1. What is the value of : 3 – 3 x 3?

(A) 3 (B) 0 (C) -3 (D) -6 (E) -9

2. What is 13% of R400 + 12% of R400?

(A) R80 (B) R100 (C) R120 (D) R140 (E) R160

3. If ¾ of the production is 510 tons then what is half of the production in tons?

(A) 340 (B) 360 (C) 380 (D) 400 (E) 420

4. If the complement of an angle is 70^0 then what is the supplement of the angle?

(A) 20^0 (B) 100^0 (C) 120^0 (D) 140^0 (E) 160^0

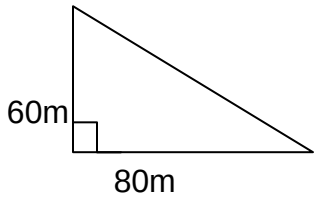
5. Which one of the following is an irrational number?

(A) $0,\dot{4}\dot{5}$ (B) $0,3\dot{6}$ (C) 0,25 (D) $\sqrt{5}$ (E) 0,123

6. What is the unit's digit of 6 x 2^{20}?

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

7. Determine the cost of enclosing this triangular plot of land at R100 per metre.



(A) R8 000 (B) R10 000 (C) R12 000 (D) R14 000 (E) R16 000

8. How many numbers between 1000 and 2000 are perfect squares?

(A) 17 (B) 16 (C)15 (D) 14 (E)13

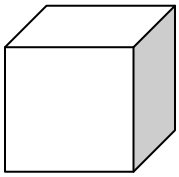
9. If 16 June falls on a Thursday in 2011 then in which earliest year will 16 June fall on a Thursday again?

(A) 2016 (B) 2017 (C) 2018 (D) 2019 (E) 2020

10. Which one of the numbers is a term of this sequence?
1; 7; 13; 19; 25;…
(A) 107 (B) 131 (C) 157 (D) 183 (E) 207

11. The sum of three whole numbers is 31. The greatest possible product the numbers can have is
(A) 1545 (B) 1454 (C)1386 (D) 1331 (E) 1100

12. The length of each edge of the cube is 12cm. 12cm
Determine the perimeter of the edges in cm.

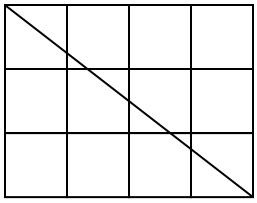


(A) 132 (B) 144 (C) 120 (D) 108 (E) 72

13. Consider the following sequence:-
1
2 3 4
5 6 7 8 9
……
What is the 3rd number of the 30th row?
(A) 844 (B) 903 (C) 964 (D) 1027 (E) 1092

14. 17 equal size matchsticks are used to form triangles.
What is the highest number of triangles that can be formed if all matchsticks are used each time?
(A) 6 (B) 7 (C) 8 (D) 9 (E) 10

15. The rectangle is divided into equal squares. The diagonal passes through 6 squares. How many squares will the diagonal pass in 15 by 12 square rectangle?



(A) 23 (B) 24 (C) 25 (D) 26 (E) 27

16. A train 500 metre long passes through a tunnel 2 km long. The train travels at a speed of 60km per hour. How long , in minutes, will it take for the back of the train to exit the tunnel?

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

17. Consider the set of 5 numbers below:-

    6; 9; 15; 21; 27

    Patrick added 3 numbers at a time to obtain a total greater than 45. How many such combinations did he get?

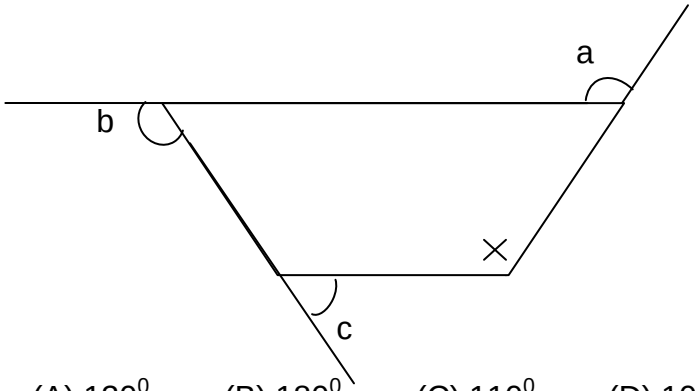
    (A) 5 (B) 6 (C) 7 (D) 8 (E) 9

18. Each boy in a family has as many sisters as brothers but each girl has twice as many brothers as sisters.

    How many brothers and sisters are there ?

    (A) 6 (B) 7 (C) 8 (D) 9 (E)10

19. Find the value of x if a +b + c = 280^0



    (A) 130^0 (B) 180^0 (C) 110^0 (D) 100^0 (E) 90^0

20. A clock takes 6 seconds to strike 6. How long will it take the same clock to strike 11?

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

MARKS: 1-15: 15 X 1 = 15

16-20: 5 X 2 = 10

TOTAL: 25

SOUTHERN AFRICAN JUNIOR MATHEMATICS OLYMPIAD

FEMSISA MATHEMATICS OLYMPIAD

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GRADE NINE

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Grade Nine Mathematics Olympiad 2011

1. Find the value of 3,2 ÷ 0,2

(A) 0,16 (B) 1,06 (C) 1,60 (D) 1,66 (E) 16

2. Sepo beat the 200m record by 0,08 seconds. If the old record was 21,2 seconds then what is the new record in seconds?

(A) 21,28 (B) 21,12 (C) 21,08 (D) 21,00 (E) 20,12

3. If 15% of Bob's money is R600 then what is the total amount Bob has?

(A) R3 000 (B) R6 000 (C) R9 000 (D) R12 000 (E) R15 000

4. If 17 June falls on Friday in 2011, then in which earliest year will 17 June will fall on a Friday again?

(A) 2021 (B) 2023 (C) 2024 (D) 2028 (E)2031

5. How many whole numbers lie between 2^4 and 2^7 ?

(A) 112 (B) 113 (C) 114 (D)114 (E) 115

6. What is the units digit of 3^{1001}

(A) 1 (B) 5 (C) 7 (D) 3 (E) 9

7. If a = 2b and 3c = 4b then a+ b – c is equal to…

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

8. What is the minimum number of apples that can be divided equally among 4; 6 or 18 people?

(A) 18 (B) 24 (C) 30 (D) 36 (E) 42

9. The table below shows the relationship between x and y which is in the form y = mx +c. The equation is …

x	4	5	6	7
y	5	7	9	11

(A) y = x+1 (B) y = 2x – 3 (C) y= 3x – 9 (D) y = x+3 (E) y = x-3

10. Mr X had 20 cent and 50 cent coins. In how many ways can Mr X give change for R5?

    (A) 14 (B) 12 (C) 10 (D) 8 (E) 6

11. In a straight row of 60 houses every 3rd house received a potted plant starting from house number one. Every 4th house received a garden bench. How many houses did not receive a garden bench or a potted plant?

    (A) 20 (B) 25 (C) 30 (D) 35 (E) 40

12. Give the sum of the digits of the following product:-

    666 666 x 999 999

    (A) 18 (B) 27 (C) 36 (D) 45 (E) 54

13. Les used 7 digits 1;2;3;5;6;7;8 to make 2 digit numbers with different digits. 1 cannot be used as a ten's digit and 5 cannot be used as the unit's digit. The sum of all such two digit numbers is…

    (A) 1144 (B) 1 787 (C) 1877 (D) 1977 (E) 1797

14. The sum of three whole numbers is 34. The greatest possible product the numbers can have is…

    (A) 1452 (B) 1440 (C) 1542 (D) 1584 (E) 1682

15. The sum of three consecutive numbers is d. The smallest number is…

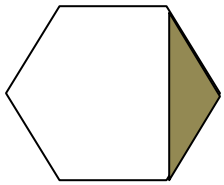
    (A) $\frac{d}{3}$ (B) $\frac{d-3}{d}$ (C) $\frac{d+3}{3}$ (D) $\frac{d+3}{d}$ (E) $\frac{d}{d-3}$

16. What is the value of :-

    11234 x 11233 – 11235 x 11232 ?

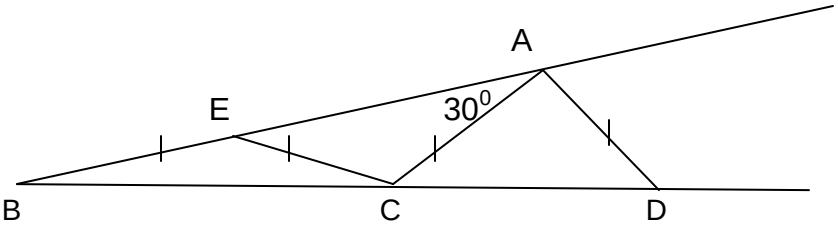
    (A) -2 (B) -1 (C) 0 (D) 1 (E) 2

17. If the area of the shaded region of a regular hexagon is $9cm^2$ then determine the area of the hexagon in cm^2 is…



(A) 54 (B) 49 (C) 45 (D) 42 (E) 36

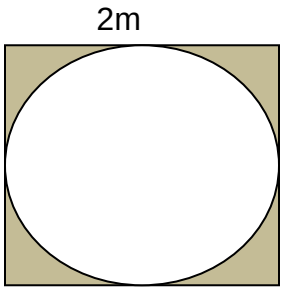
18.



In the above figure EA = EC = CA = AD; $E\hat{A}C = 30^0$. Calculate $D\hat{A}C$.

(A) 45^0 (B) 60^0 (C) 75^0 (D) 90^0 (E) 105^0

19. A circle is drawn to touch the 4 sides of the square with side measuring 2m. Calculate the area of the shaded region.



(A) $2 - \pi$ (B) $4 - \pi$ (C) $2 + \pi$ (D) $4 + \pi$ (E) $4 - 2\pi$

20. The formula that calculates the times in minutes the hour hand and the minute hand will be opposite each other is …

(A) $\frac{30}{11}(2n-1)$ (B) $\frac{30}{11}(1-2n)$ (C) $\frac{30}{11}(2n+1)$ (D) $\frac{30}{11}(3n-1)$ (E) $\frac{30}{11}(3n-2)$

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