SOUTHERN AFRICAN JUNIOR MATHEMATICS OLYMPIAD FEMSSISA

GRADE 8

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DATE: 28 AUGUST 2023 – 1 SEPTEMBER 2023

TIME: 90 MINUTES

INSTRUCTIONS:

1. This booklet has 15 multiple choice and 5 open ended 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.
4. Calculators are not permitted.
5. Diagrams are not necessarily drawn to scale.
6. The first 15 problems carry 1 mark each and the next 5 carry 2 marks each.
7. You have 90 minutes for the paper which works out to an average of 4.5 minutes per question.
8. Read the questions carefully before answering.
9. Visit the website: www.saolympiads.co.za.

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Grade Eight Mathematics Olympiad 2023

1. What is the value of: 15 x 20 – 20 x 20?

   (A) -80 (B) -100 (C) -120 (D) -140

2. If $\frac{3}{8}$ of the production in a week is 3300 items, then what is $\frac{1}{4}$ of the number of the items?

   (A) 2200 (B) 3300 (C) 4400 (D) 5500

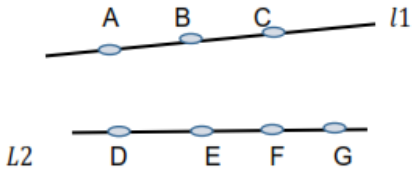
3. If a – b = 16; b – c = 4; c – d = 5 and a + d = 29 then find the value of a.

   (A) 33 (B) 31 (C) 29 (D) 27

4. For what values of n will 634n8 is divisible by 11?

   (A) 6 (B) 5 (C) 4 (D) 3

5. If two points from line 1 is joined to one point from line 2, a triangle is formed. What is the maximum number of triangles that can be formed?



   (A) 9 (B) 10 (C) 11 (D) 12

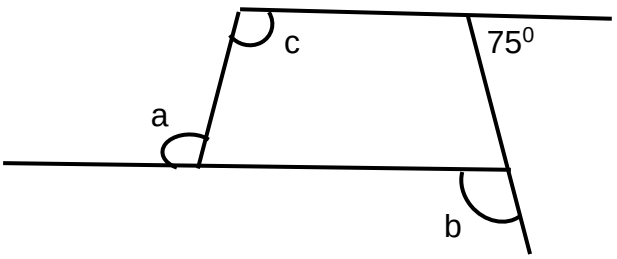
6. Consider the following sequence:-

4 6 8
10 12 14 16
18 20 22 24 26
……..

What is the 2nd number from the left of the 24th row?

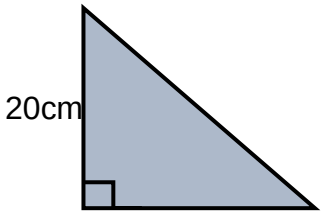
(A) 642 (B) 646 (C) 650 (D) 654

7. Find the value of c if a + b = 200^0 and the 3 sides of the quadrilateral are produced.



(A) 95^0 (B) 100^0 (C) 105^0 (D) 110^0

8. Determine the perimeter of the triangular sheet in cm if the area is $150cm^2$.



(A) 60 (B) 65 (C) 70 (D) 75

9. Find the sum of the digits of the answer.

$(\underbrace{999\ldots.999}_{30\text{ digits}} \times \underbrace{555\ldots.555}_{20\text{ digits}}) \div (\underbrace{333\ldots.333}_{30\text{ digits}} \times \underbrace{111\ldots111}_{10\text{ digits}})$

(A) 10 (B) 12 (C) 14 (D) 16

10. Evaluate:

$$\mathbf{32 \times 21\frac{5}{8}}$$

(A) 706 (B) 702 (C) 696 (D) 692

11. If the sum of half an angle's supplement and its complement is 120^0 then find the angle.

(A) 40^0 (B) 45^0 (C) 50^0 (D) 55^0

12. 125 cubes measuring 1cm with all pink faces are used to form one large cube. Two of the opposite faces are painted white. These cubes were then dismantled. How many cubes have 5 pink faces?

(A) 75 (B)60 (C) 50 (D) 40

13. Three fractions a; b and c are placed between $\frac{1}{9}$ and $\frac{1}{3}$ such that all 5 fractions are equally placed from each other. Determine a + b + c.

(A) $\frac{5}{6}$ (B) $\frac{1}{4}$ (C) $\frac{2}{3}$ (D) $\frac{3}{8}$

14. Given $\frac{3}{a} + \frac{1}{b} = \frac{13}{24}$ such that a:b = 4:3 then find the value of a + b = ……

(A) 12 (B) 14 (C) 16 (D) 18

15. A bus travels from Aintrie at an average speed of 60km/h to Bantry. A car travels from Bantry at an average speed of 90km/h to Aintrie. Both left at the same time and in the opposite directions. They meet after 70minutes. What is the distance between Aintrie and Bantry in km?

    (A) 150 (B) 160 (C) 175 (D) 180

16. What is the smaller angle between the hour hand and the minute hand of an analogue clock when the time is 9:10 pm?

17. For what integral value of n will the following expression have the lowest positive integral value?

$$\frac{3n + 14}{n - 2}$$

18. 20 litres of a container have 20% concentrate. How many litres of water must be added so that the mixture has 15% concentrate?

19. Find the value of:-

    159 -155+151-147+143 -.....- 67+63

20. 56 equal size matchsticks are used to construct rhombuses with a shorter diagonal. How many such rhombuses can be constructed if all the matchsticks are used each time?

MARKS: 1-15: 15 X 1 = 15
16-20: 5 X 2 = 10

TOTAL = 25