SOUTHERN AFRICAN JUNIOR MATHEMATICS OLYMPIAD FEMSSISA

GRADE 8

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DATE: 15 – 19 AUGUST 2022

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 one 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 websites: www.saolympiads.co.za.

Grade Eight Mathematics Olympiad 2022

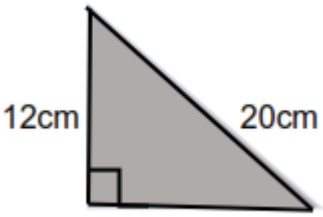
1. What is the value of: 55 x 33 – 33 x 24 – 33 x 26?

   (A) 275 (B) 220 (C) 165 (D) 110

2. If $\frac{2}{5}$ of the production in a week is 22 000 items, then what is $\frac{1}{11}$ of the number of the items?

   (A) 4 000 (B) 5 000 (C) 6 000 (D) 7 000

3. Determine the area of the triangular sheet in cm^2..

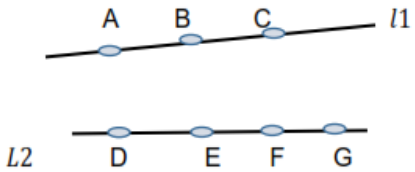


   (A) 96 (B) 108 (C) 120 (D) 132

4. For what values of n will 39n7n is divisible by 6?

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

5. If two points from line 1 is joined to two points from line 2 a quadrilateral is formed. What is the maximum number of quadrilaterals that can be formed?



   (A) 30 (B) 24 (C) 18 (D) 12

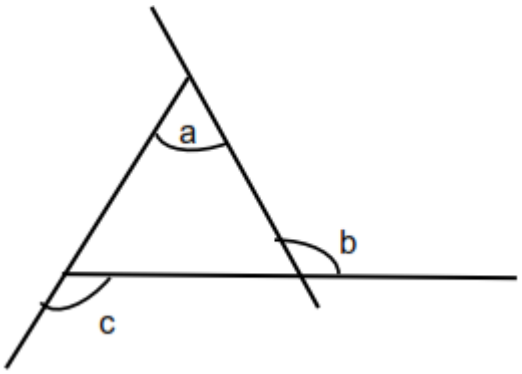
6. Consider the following sequence:-

7 9 11
13 15 17 19
21 23 25 27 29
.....

What is the 3rd number from the left of the 19th row?

(A) 410 (B) 415 (C) 420 (D) 425

7. Find the value of b if c - a = 40^0 and all the sides of the triangle is produced.



(A) 140^0 (B) 130^0 (C) 120 (D) 110^0

8. The sum of 4 natural numbers is 41. What is the greatest possible product of these 4 numbers?

(A) 13 000 (B) 12 000 (C) 11 000 (D) 10 000

9. Find the sum of the digits of:

$$\underbrace{(888\ldots888}_{\text{20 digits}} \times \underbrace{666\ldots666)}_{\text{40 digits}} \div \underbrace{(222\ldots222}_{\text{20 digits}} \times \underbrace{333\ldots333)}_{\text{20 digits}}$$

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

10. Evaluate:

$$\mathbf{48 \times 19\ \frac{7}{12}}$$

(A) 920 (B) 940 (C) 960 (D) 980

11. If the difference of half an angle's supplement and its complement is 10^0 then find the angle.

(A) 10^0 (B) 15^0 (C) 20^0 (D) 35^0

12. An ant travels alongside a regular hexagon with each side measuring 6 metres and done always keeping 2 metres from the side of the hexagon. What distance, in metres, would the ant have travelled when it returns to the original position?
$\pi = \frac{22}{7}$

(A) $48\frac{1}{7}$ (B) $48\frac{4}{7}$ (C) $48\frac{5}{7}$ (D) 48

13. If a + b = 16; b+ c = 14 and a + c = 10 then determine the value of $(a + b + c)^3$

(A) 8000 (B) 7 600 (C) 7 200 (D) 1 000

14. Given $\frac{5}{a} + \frac{1}{b} = \frac{3}{4}$ such that a:b = 4:1 then find the value of a x b = ……

(A) 24 (B) 28 (C) 32 (D) 36

15. A train 750 metres long passes through a tunnels 3km long. The train travels at a speed of 90km/h. How long, in minutes, will it take for the back of the train to exit the tunnel?

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

16. What is the smaller angle between the hour hand and the minute hand of an analogue clock when the time is 7.30 pm?

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

$$\frac{2n+24}{n+3}$$

18. 12 litres of a container has 30% concentrate. How many litres of water must be added so that the mixture has 20% concentrate?

19. Find a+b+c if the sum is $\frac{c}{217}$.

$$\frac{1}{7x9}+\frac{1}{9x11}+\frac{1}{11x13}+\cdots.+\frac{1}{axb}$$

20. 48 equal size matchsticks are used to construct parallelograms with a longer diagonal. How many such parallelograms can be constructed if all matchsticks are used each time?

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