SOUTHERN AFRICAN JUNIOR MATHEMATICS OLYMPIAD FEMSSISA

GRADE9

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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.

Grade Nine Mathematics Olympiad 2023

1. If 40% of the land is 800m^2 then what is the area of the land?

   (A) 2000 (B) 1900 (C) 1800 (D) 1600

2. If (x+4) is the factor of $2x^2 + (2- p)x – 12$ then find the value of p ?

   (A) 2 (B) 3 (C) -2 (D) -3

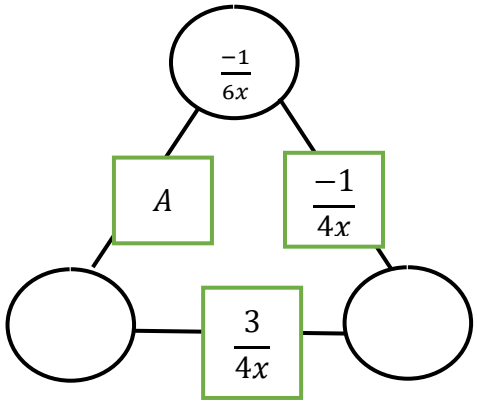
3. The product of $(3x -4)(9x^2 + 12x + 16)$ is …

   (A) $64 -27x^3$ (B) $27x^3+ 64$ (C) $27x^3- 64$ (D) $27x^3-48x^2 - 48$

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

x	4	-4
y	2	8

   (A) $y = \frac{3}{4}x - 5$ (B) $y = \frac{-3}{4}x + 5$ C) $y = \frac{-1}{4}x + 6$ (D) $y = \frac{-3}{4}x + 4$

5. 

   In the above game the sum of the two expressions in the 2 circles gives the expression in the square between them. Determine A in terms of x.

   (A) $\frac{1}{6X}$ (B) $\frac{-1}{3X}$ (C) $\frac{1}{3X}$ (D) $\frac{2}{3X}$

6. If $\frac{4}{13} = 0.\dot{3}07692\dot{}$ then write down 65th digit after the decimal point.

(A) 0 (B) 6 (C) 9 (D) 2

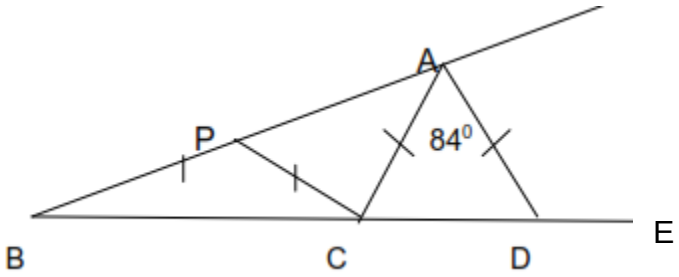
7. The sum of seven consecutive odd numbers with a common difference of 2 is $\frac{k}{2}$. The largest number in terms of 'k' is…

(A) $\frac{k+84}{14}$ (B) $\frac{k+64}{14}$ (C) $\frac{k+48}{14}$ (D) $\frac{k+42}{14}$

8. What is the value of: 3926x3926 – 3923 x 3929?

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

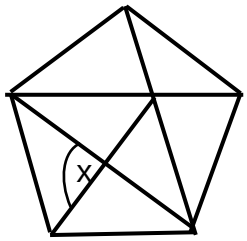
9.



In the above figure PB = PC = AC = AD. $A\hat{\hat{P}}C$ = x and $C\hat{A}D = 84^0$
Determine the measurement of x.

(A) 32^0 (B) 34^0 (C) 36^0 (D) 38^0

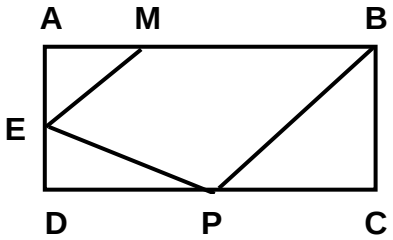
10.



In the above figure which is a regular pentagon the measurement of x is …

(A) 36^0 (B) 54^0 (C) 72^0 (D) 90^0

11. Rectangle ABCD has M on AB such that MB is three times AM. E is the midpoint of AD and P is the midpoint of DC. If the area of ABCD = 640cm^2 then find the area of MEPB in cm^2.



(A) 320 (B) 360 (C) 400 (D) 440

12. What is the minimum number of bitcoins that can be divided equally among 12; 18 or 24 investors?

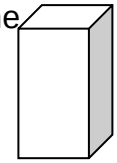
(A) 96 (B) 84 (C) 72 (D) 60

13. How many different natural numbers can n have such that M is a natural number?

M = $\frac{12n+20}{3n+1}$

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

14. A rectangular container has a square base with its height being 4 times the length of the base. The surface area of this closed container is 450 cm^2.Calculate the capacity of this container in ml.



(A) 700 (B) 600 (C) 500 (D) 400

15. Four plastic digits 2;3; 5; 7 are used to construct 3 digit numbers such that each number is divisible by 3. How many different combinations are there?

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

16. D is taller than F.
P is shorter than T.
E is taller than R but shorter than F.
R is shorter than T but taller than P.
T is shorter than F.
Who is the 2nd tallest?

17. 55 ladies participate in Cookery or Sewing or both. 35 participate in Cookery. The number who participate in Sewing only is twice the number participating in Cookery only. How many participate in Sewing?

18. At 6 o'clock the hour hand and the minute hand are opposite each other. What will the angle between the minute hand and hour hand on an analogue clock be at 20 past 6 (in degrees)?

19. Find the sum of the numbers in the 15th bracket for this arithmetic sequence.

(2;4); (6;8;10); (12;14; 16; 18); ...

20. 6 learners left their track tops before playing soccer. In how many different ways can 4 learners take the wrong track tops home?

MARKS: 1-15: 15 X 1 = 15
16-20: 5 X 2 = 10
TOTAL = 25