FEMSSISA MATHEMATICS OLYMPIAD: Grade 8 - 12

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MATHEMATICS OLYMPIAD GRADE NINE

DATE: 4 AUGUST 2025

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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1. Factorize: $x^2 - 4x - 32$

   (A) (x+8)(x+4) (B) (x+8)(x-4) (C) (x-8)(x+4) (D) (x-8)(x-4)

2. Fill 900 000 kl in 50 minutes to kl/min.

   (A) 16 (B) 18 (C) 20 (D) 25

3. The product of $(6x - y)(36x^2 + 6xy + y^2)$ is …

   (A) $216x^3 - y^3$ (B) $8x^3 - 27y^3$ (C) $8x^3 - 12xy - 27y^3$ (D) $8x^3 - y^3$

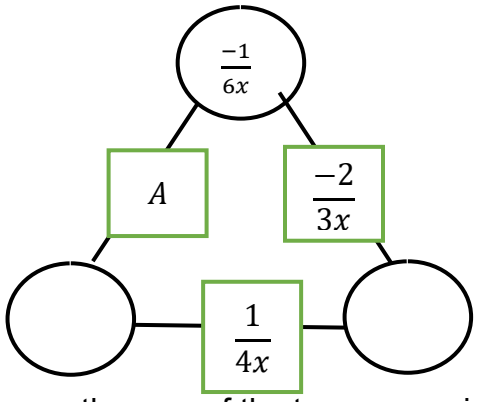
4. The table below shows the relationship between x and y which is in the form: y = mx +c. The equation is …

x	-4			8
y	1			-8

   (A) $y = \frac{3}{4}x + 2$ (B) $y = -\frac{3}{4}x - 2$ C) $y = -3x - 2$ (D) $y = 3x + 2$

5. Determine the product: $(9x - 5y)^2$

   (A) $81x^2 - 45xy + 25y^2$ (B) $x^2 - 45xy + 25y^2$ (C) $81x^2 - 90xy + 25y^2$ (D) $81x^2 - 25y^2$

6. 

   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) $\frac{5}{6X}$ (B) $\frac{-1}{4X}$ (C) $\frac{-1}{6X}$ (D) $\frac{7}{12X}$

7. Give the value of $(3 - 4n)(5-3n)(2n+7)$ if n = - 4.

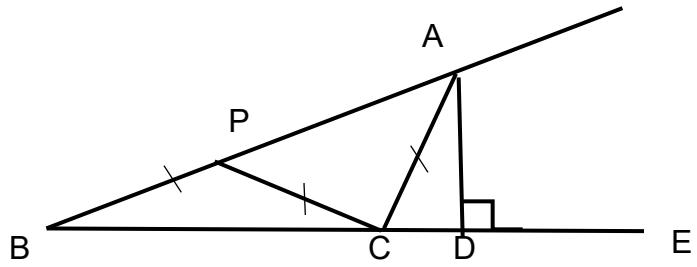
   (A) 263 (B) 293 (C) -323 (D) 321

8. The sum of 9 consecutive odd numbers with a common difference of 4 is 225. What is the largest number?

   (A) 41 (B) 45 (C) 50 (D) 55

9. What is the value of: 2704 x 2702 – 2701 x 2705?
(A) 6 (B) 5 (C) 4 (D) 3

10.



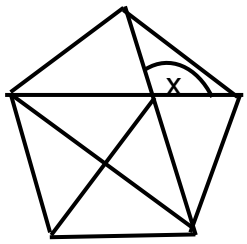
In the above figure PB = PC = AC $P\hat{B}C$ = x and $C\hat{A}D$ = 15^0
Determine the measurement of $P\hat{C}A$.

(A) 100^0 (B) 95^0 (C) 80^0 (D) 75^0

11. If (x+3) is the factor of $4x^2 + (3- p)x – 6$ then find the value of p?

(A) -8 (B) -7 (C) -6 (D) -5

12.



In the above figure which is a regular pentagon the measurement of x is…….
(A) 84^0 (B) 104^0 (C) 108^0 (D) 120^0

13. If $\frac{7}{12} = 0.58\dot{3}$ then write down the sum of the 42 digits after the decimal point.
(A) 140 (B) 143 (C) 133 (D) 120

14. Ms Thando has a variety of fish in her huge tank. At the end of the year the number of fish decreased by 20%. At the end of the following year there was a 10% increase in the fish. If the net decrease is 36 fish, then what was the initial number of fish in the tank.
(A) 330 (B) 300 (C) 270 (D) 240

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

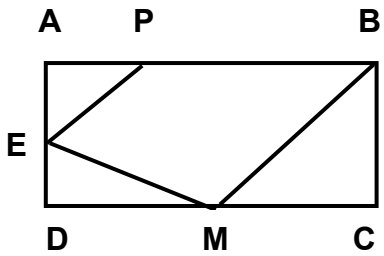
M = $\frac{8n+4}{n-1}$

(A) 6 (B) 4 (C) 3 (D) 2

16. Sarah used 6 plastic digits 2; 3; 5; 6; 7; 8 to make 3 digit numbers. 2 cannot be used as a unit's digit and 6 cannot be used as a hundred's digit. How many such 3 digit numbers can be constructed?

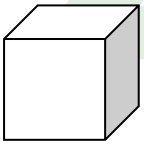
17. 65 athletes participate in 400 metres or 800 metres or both.
The number who participate in 800m only is twice the number participating in 400 metres only. If 5 participate in both events, then how many participated in 800 metres only?

18. Rectangle ABCD has P on AB such that PB is three times AP. E is the point of AD such that AE = 2 x ED. If the area of PEMB = 350cm^2 then find the area of ABCD in cm^2 if M is the midpoint of DC.



19. Find the sum of the numbers in the 20th bracket for this arithmetic sequence.
(2;4); (6 ;8; 10); (12;14; 16; 18); (20;22; 24; 26; 28); ...

20. A closed rectangular container has a rectangular base with its height being 3 times the length of the base. The width of the base is 15cm. The surface area of this closed container is 3150 cm^2.Calculate the capacity of this container in $ml\ if\ 1cm^3 = 1ml$.



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