FEMSSISA MATHEMATICS OLYMPIAD: Grade 8 - 12

science & innovation
Department:
Science and Innovation
REPUBLIC OF SOUTH AFRICA

SA OLYMPIADS

E-mail: Maths@saolympiads.co.za website: www.saolympiads.co.za

MATHEMATICS OLYMPIAD
GRADE ELEVEN

DATE: 4 – 5 AUGUST 2026
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.

ENJOY THE OLYMPIAD!

GRADE ELEVEN

SECTION A: MULTIPLE CHOICE (Questions 1 – 15, 1 mark each)

1. For what values of x is E undefined and unreal?

E = $\frac{4}{\sqrt{X^2-16}}$

(A) $x \geq 4$ (B) x >4

(C) x=4 or x =-4 (D) $-4 < x < 4$

2. Simplify:

$\frac{6x^2+x-2}{6x^2-7x+2} \div \frac{12x^2+11x+2}{9x^2-4}$

(A) $\frac{x+3}{4x+1}$ (B) $\frac{3x-2}{4x+1}$

(C) $\frac{3x+2}{4x+1}$ (D) $\frac{2x-3}{4x}$

3. Determine the distance AB if:

A(-3; 4) and B(3; 12)

(A) 10 (B) 8 (C) 6 (D) 5

4. The number (623 - n) is divisible by 5; 9 and 11. Find the largest value of 'n'>0.

(A) 65 (B) 128

(C) 55 (D) 50

5. Without using a calculator evaluate:

$\frac{cos^2 240^0}{tan 150^0 x\ sin 240^0}$

(A) $\frac{1}{4}$ (B) $\frac{\sqrt{3}}{2}$

(C) $\frac{1}{2}$ (D) $\frac{1}{6}$

6. Solve for x: $(3x-2)^4 - 13(3x-2)^2 + 36 = 0$

(A) $\frac{-1}{3}; \frac{4}{3} only$ (B) $\frac{-1}{3}; \frac{4}{3}; \frac{5}{3}; 0$

(C) $\frac{5}{3}; 0 only$ (D) $\frac{-1}{3}; \frac{4}{3};\ 0\ only$

7. 3000 coins were divided equally among a certain number of persons. If there were 10 more people who shared this amount, then each one would receive 25 less coins. How many people are in the initial group?

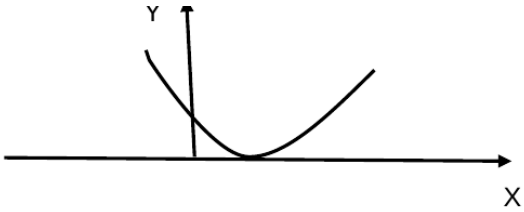
(A) 30 (B) 75 (C) 60 (D) 50

8. $\frac{\sin x}{1+\cos x} - \frac{\sin x}{1-\cos x} = \cdots \ldots$

(A) $\frac{2}{\tan x}$ (B) $\frac{2}{\sin x}$

(C) $\frac{-2}{\tan x}$ (D) $\frac{-2}{\cos x}$

9. The graph A below is defined by $y = x^2 - 4x + 4$. The equation of the graph which is reflected about the Y-axis and is translated 3 units vertically upwards is…



(A) $y = x^2 - 4x + 5$ (B) $y = x^2 + -4x$
(C) $y = x^2 - 4x + 7$ (D) $y = x^2 + 4x + 7$

10. What is the value(s) of x where $\sqrt{3x-2} + \sqrt{2x+5} = 5$?
(A) 2 (B) 262 (C) 2 or 262 (D) -2

11. What is the maximum integer value of $\frac{36}{n^2-4n}$ where n is an integer?
(A) 6 (B) 4
(C) 3 (D) 2

12. The roots of $ax^2 + bx + c = 0$ are $6 + \sqrt{5}$ and $6 - \sqrt{5}$.
The value of a + b+ c is….
(A) 16 (B) -20
(C) 20 (D) 24

13. The equation of l_1 is : $ky = (3-k)x + 6$.
For what values of k will l_1 be parallel to 2y -4x = 5?
(A) -1 (B) 3 (C) 2 (D) 1

14. Solve for x:

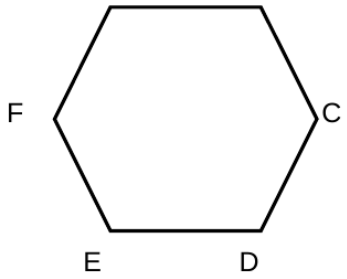
$$\frac{4}{3-x} \leq 1$$

(A) $-1 \leq x < 3$ (B) $x \leq -1 \text{ or } x > 3$
(C) $x \geq 3$ (D) $x \leq -1 \text{ or } x \geq 3$

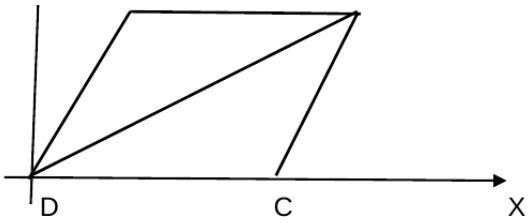
15. 8 orange blocks and 6 white blocks are placed in a bag. A block is drawn at random and not replaced. A second and third block are randomly drawn in the same way. What is the probability of drawing at least 2 white blocks?
(A) $\frac{50}{91}$ (B) $\frac{40}{91}$
(C) $\frac{35}{91}$ (D) $\frac{30}{91}$

SECTION B: OPEN ENDED (Questions 16 – 20, 2 marks each)

16. In the following regular hexagon, the perimeter of ABCDEF is 48cm. Determine the area of ABCDEF in cm^2.

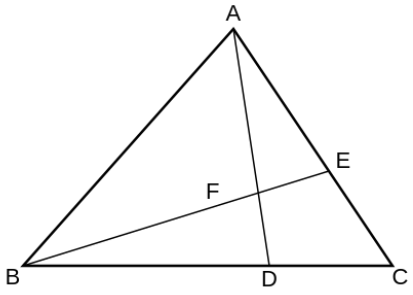


17. In the figure below ABCD is a rhombus where A has the following co-ordinates A(6;8). Determine the area of ABCD in square units.

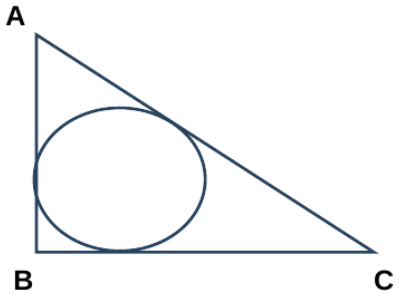


18. 7 family members went to a movie, and all were seated next to each other in the same row. In how many different ways could they sit together if 3 members had to sit next to each other?

19. In the adjacent triangle, D divides BC in the ratio 2:1. E divides AC in the ratio 3:2. BE intersects AD at F. Determine the ratio of BF:FE.



20. A circle is inscribed in ΔABC as shown below. If the AB=12cm and the radius of the inscribed circle is 4cm then determine the perimeter in cm of ΔABC .



MARKS: 1–15: 15 × 1 = 15
16–20: 5 × 2 = 10
TOTAL: 25