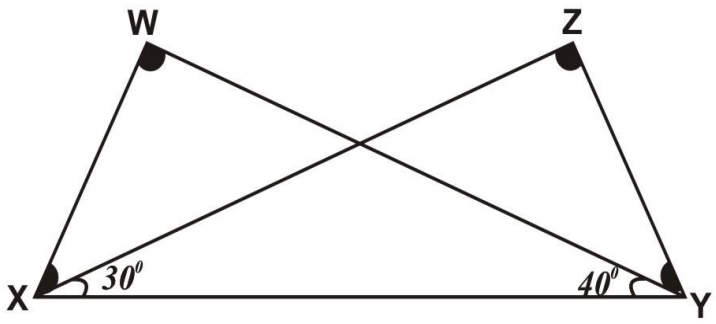
5. In the diagram below, what is the sum of the four shaded angles?



THE MATHEMATICAL ASSOCIATION OF NIGERIA (MAN)

(LAGOS STATE)

2025 OLYMPIAD

CATEGORY: **PRIMARY**

DATE: 10th MAY, 2025

TIME: 1½hrs

Instructions:

1. This paper consists of two parts; PART A and PART B. Answer all the questions in each part.
2. The use of CALCULATORS or any ELECTRONIC DEVICES and STATISTICAL TABLES are not allowed.
3. Make sure your invigilator signs your answer booklet.
4. There is NO PROVISION for any *extra* answer sheet. All extra sheet will not be marked. Do not tear any part of your answer booklet.
5. Write your NAMES, your SCHOOL and your EXAMINATION number correctly on each page of your answer booklet.
6. CLARITY, NEATNESS and ORDERLINESS are highly encouraged.
7. Check your result with your Olympiad registration pin on www.manlagosstate.com from Monday, June 9, 2025

DO NOT OPEN UNTIL YOU ARE TOLD TO DO SO

PART A

1a. What is the value of y in the sequence: 1, 2, 6, 24, y?

b. Find the HCF of 2, 9 and 25.

2a. Find the sum of all first five positive prime numbers.

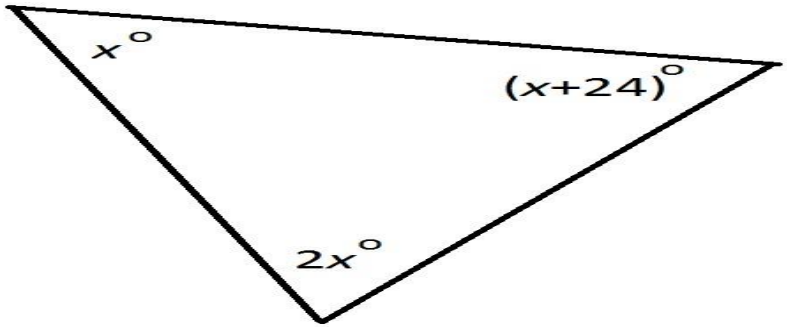
b. In 2024 Mrs. Ogungbo's salary was N375,500:00. Now, her salary has been increased by 15%. How much is her new salary?

3a. The area of a rectangle is 1.8 times the area of a square. The length of the rectangle is 5 times the breadth. If the side of the square is 20cm, what is the perimeter of the rectangle?

b. Nine examiners can examine a certain number of answer scripts in 12days by working for 5hours a day. How many hours in a day should 4 examiners work to examine twice the number of answer scripts in 30days?

4a. Mr. Adamu walks a certain distance and ride back taking a total of 37mins. He could walk both ways in 55seconds. How long will it take him to ride both ways?

b. Find the value of x in the diagram below:



5a. If A:B=3:4, B:C=5:7 and C:D=8:9. Find the value of A:D.

b. Simplify: $\frac{x+2}{x+4} \div \frac{3x+6}{x^2-16}$

PART B

1. In an examination, out of 480 students, 85% of the girls and 70% of the boys passed. If the total pass mark was 75%, how many boys appeared for the examination?

2. The area of a circle is increased by 22cm^2 while its radius is increased by 1cm. Find the original radius of the circle.

3. AbdusSalam spent $\frac{1}{4}$ of his money on transport, $\frac{1}{3}$ on food and $\frac{1}{5}$ of the remainder on school fees. If he had ₦300:00 left, how much had he initially?

4. If $x + y$=10 and xy=5, find the numerical value of $\frac{x}{y} + \frac{y}{x}$

THE MATHEMATICAL ASSOCIATION OF NIGERIA (MAN)

(LAGOS STATE)

2025 OLYMPIAD

CATEGORY: **JUNIOR**

DATE: 10TH MAY, 2025

TIME: $1\frac{3}{4}$hrs

Instructions:

1. This paper consists of two parts; PART A and PART B. Answer all the questions in each part.
2. The use of CALCULATORS or any ELECTRONIC DEVICES and STATISTICAL TABLES are not allowed.
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4. There is NO PROVISION for any *extra* answer sheet. All extra sheet will not be marked. Do not tear any part of your answer booklet.
5. Write your NAMES, your SCHOOL and your EXAMINATION number correctly on each page of your answer booklet.
6. CLARITY, NEATNESS and ORDERLINESS are highly encouraged.
7. Check your result with your Olympiad registration pin on www.manlagosstate.com from Monday, June 9, 2025

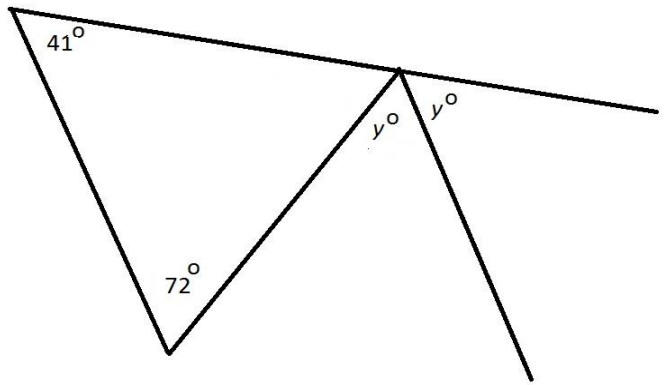
DO NOT OPEN UNTIL YOU ARE TOLD TO DO SO

PART A

1a. If $\sqrt{5+\sqrt[3]{x}}=3$. Find the value of x.

b. Find the area of the rings between two concentric circles whose circumferences are 88cm and 132cm.

2a. Find the value of y in the diagram below:



b. Simplify: $(256)^{0.16}$ X $(16)^{0.18}$

3a. Given that p=$3\cos\theta$ and that q=$2\sin\theta$. Show that $4p^2+9q^2=36$.

b. If $5(2x+1)+c(x+d)=12x-1$. Find the value of c and d.

4a. For what values of x are both the inequalities $8+4x>0$ and $7-3x>0$

b. A sum of money on compound interest amounts to ₦10, 648:00 in 3years and ₦9,680:00 in 2years. Find the rate of interest per annum.

5a. Find the sum of 10111_{two}, 101011_{two} and 111_{two}

b. Make r the change of subject if

$$S=2\pi r(r+h)$$

PART B

1. Find the roots of the equation: $\frac{x+4}{x-4}+\frac{x-4}{x+4}=\frac{10}{3}$

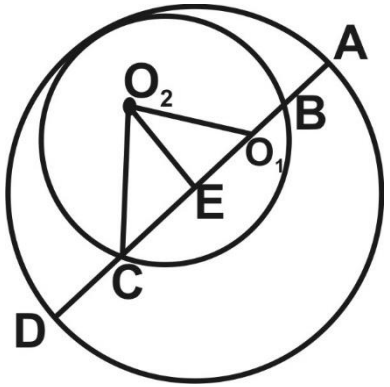
2. Mr. Hassan borrowed ₦500:00 for 3years at 5% compound interest. He pays ₦120:00 at the end of each year. How much did he borrow at the end of the 3rd year?

3. Given that $124_x=232_{five}$. Find the value of x.

4. If x varies partly as y and partly as the square of y. When $y=2, x=5$ and when $y=5, x=57.5$. Find the value of x when $y=4$.

5. If $a=\frac{\sqrt{3}}{2}$. Find the value of $\sqrt{1+a}+\sqrt{1-a}$.

3. In the diagram below, two circles are internally tangent. A line passes through the center of the larger circle intersects it at the points A and D. The same line intersects the smaller circle at the points B and C. Given that $|AB|:|BC|:|CD| = 3:7:2$. Find the ratio of the radius of the circles.



4. The iterated power a^{b^c} denotes $a^{(b^c)}$. Given that x is a real number which satisfies the equation: $2^{2^x} + 4^{2^x} = 42$ Find the value of $\sqrt{4^{2^{2^x}}}$

5. My cat keeps to itself most of the time. I only heard it meow, hiss and purr on one day out of the last 23days, but I did hear it make at least one of these sounds each day. I heard it hiss but not purr once, and on 2days I heard it purr and hiss but not meow. On how many days did I hear it meow and purr but not hiss?

THE MATHEMATICAL ASSOCIATION OF NIGERIA (MAN) (LAGOS STATE)

2025 OLYMPIAD

CATEGORY: **SENIOR**
DATE: 10th MAY, 2025
TIME: $1\frac{3}{4}$hrs

Instructions:

1. This paper consists of two parts; PART A and PART B. Answer all the questions in each part.
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DO NOT OPEN UNTIL YOU ARE TOLD TO DO SO

PART A

1a. What value of x makes the expression undefined?

$$\frac{x^2 + 5x + 6}{x^2 - 9}$$

b. List all the integers that satisfy the inequality:

$$-2 \leq 2x - 6 \leq 4$$

2a. There are two regular polygons with number of sides equal to $(n-1)$ and $(n+1)$, find the value of n if their exterior angles differ by 6^0.

b. In an argument, the percentage that Mr. A speaks the truth is 60% while the percentage that Mr. B speaks the truth is 80%. In what percentage are they likely to contradict each other on the same argument?

3a. If α, β and γ each is positive acute angle and

$$sin(\alpha + \beta - \gamma) = \frac{1}{2}$$

$$cos(\beta + \gamma - \alpha) = \frac{1}{2}$$

$tan(\gamma + \alpha - \beta) = 1$,
find the value of $(2\alpha + \beta)$

b. Twenty Premier League football teams are to play in a league on a home and away-basis. How many matches are possible?

4a. If the equation $(7p+1)x^2 + (5p-1)x + p = 1$ has the equal roots, find the values of p.

b. If $\tan(5x - 10^0) = \cot(5y + 20^0)$, find the value of $x + y$.

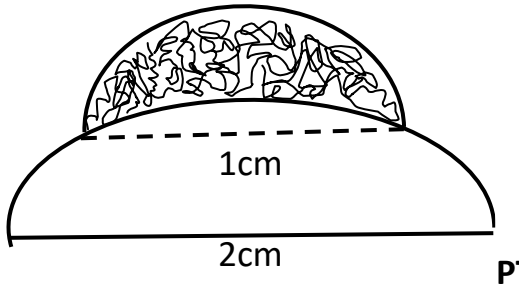
5a. Evaluate: $\int [(3t + t^2)(\sin 2t)\,]dt$

b. Solve for x if $\log_2 x + \log_x 4 = 3$

PART B

1. Prove the identity: $2tan^{-1}x = cos^{-1}(\frac{1-x^2}{1+x^2})$

2. A semi-circle of diameter 1cm sits at the top of a semi-circle of diameter 2cm as shown below. The shaded area inside the smaller semi-circle and outer the larger semi-circle is called Lune. Determine the area of the Lune, leaving your answer in $\boldsymbol{\pi}$ form. (Note that your answer does not depend on the position of the Lune in the semi-circle).



PTO