3a. In a school, 1,200 of the students are boys, if 50% of the boys and 40% of the girls have paid their school fees. Find the number of girls, given that 46% of the population has paid their school fees.

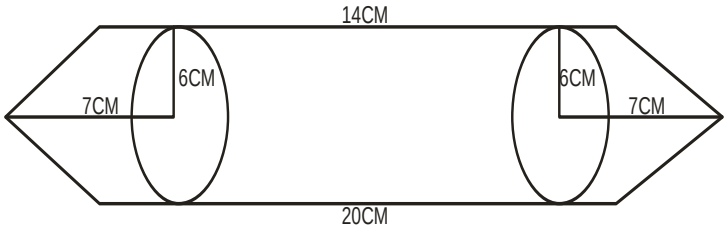
b. When 2 was added to a certain number and this sum was doubled, the result was 36 less than the original number multiplied by four. Find the number.

4a. A rhombus has diagonals of length 6cm and 8cm. Find the length of its sides.

b. A regular hexagon is constructed inside a circle of diameter 12cm, find the area of the circle not occupied by the hexagon.
(Take Sin 60 = $\frac{\sqrt{3}}{2}$ and $\sqrt{3}$ = 1.732)

5a. The sum of two numbers is 22. The sum of $\frac{3}{4}$ of one of the numbers and $\frac{1}{5}$ of the other number is 11. Find the two numbers.

b. Find the volume of the composite shapes.



Check your result with your Olympiad seat number on April 30, 2018

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

2018 OLYMPIAD

CATEGORY: **JUNIOR**
DATE: MARCH 24, 2018
TIME: 2HRS 30MINS

Instructions

1. Answer all the questions in PART A and PART B.
2. The use of CALCULATORS or any ELECTRONIC DEVICES and FOUR FIGURED TABLES are not allowed.
3. Clarity, Neatness and Orderliness are highly encouraged.
4. Make sure all your answer scripts are stamped and signed.
5. Attach all extra sheets firmly. Avoid tearing any part of your answer sheets.
6. Do not forget to write your Olympiad seat number correctly on all your answer scripts.
7. Check your result with your Olympiad seat number on www.manlagosstate.com

DO NOT OPEN UNTIL YOU ARE TOLD TO DO SO.

PART A

1a. Represent the solution of $\frac{x}{3} - \frac{x-3}{2} \leq 1$ on a number line graph.

b. A student measured the length of a room and obtained the measurement as 3.99m. If the percentage error of his measurement is 5% and his measurement was smaller than the length. What is the length of the room?

2a. Simplify $\frac{9.6 \text{ X } 10^{18}}{0.24 \ X \ 10^{5}}$ and express your answer in the form P x10^{m} where 1<P>10 and m is an integer.

b. If (x+3) varies directly as y and x=3 when y=12. What is the value of x when y = 8

3a. Simplify $\frac{x-y}{x+y}$ - $\frac{x+y}{x-y}$

b. Find the positive value of x if (x-1)^2 = $\frac{4}{9}$

4a. If ₦153 is shared among Tabade, Titilope and Tochukwu respectively in the ratio $\frac{1}{3} : \frac{1}{6} : \frac{1}{4}$. What is Titilope's share?

b. Make *'d'* the subject of the formula in *Sn*= $\frac{1}{2}$*n (2a + (n—1)d)*

5a. The sum of three numbers is 98. The ratio of the first to the second is $\frac{2}{3}$ and the ratio of the second to the third is $\frac{5}{8}$. Find the second number.

b. The cylinders A and B below have surface area of 1600cm^2 and 900cm^2 respectively. Given that the cylinders are similar. Find the value of$x$.

PART B

1a. The functions *f* and g are defined by $f(x) = \frac{1}{x} + 3x$ and g(x)= - $\frac{1}{x}$ + 6x - 4. Find *(f+g)x*

b. Given that $\frac{1}{2}\log_{10}$ P = 1. Find the value of P.

2a. The sum of the ages of Fatimah and her mother is 38. Next year the mother would be four times as old as her daughter. How old was the mother when the daughter was born.

b. Simplify $\frac{4\sqrt{18}}{\sqrt{8}}$

4a. The first, second and fifth term of a linear sequence (AP) are three consecutive terms respectively of an exponential sequence (G.P). If the first term of the linear sequence is 7, find its common difference.

b. Prove that ${}^{n}C_{r} + {}^{n}C_{r-1} = {}^{n+1}C_{r}$

5a. If x and y are the coefficient of b^4 and b^5 respectively when $(a + b)^5$ is expanded. Find the value of $x + y$.

b. 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?

Check your result with your Olympiad seat number on

April 30, 2018

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

2018 OLYMPIAD

CATEGORY: **SENIOR**
DATE: MARCH 24, 2018
TIME: 2HRS 30MINS

Instructions

1. Answer all the questions in PART A and PART B.
2. The use of CALCULATORS or any ELECTRONIC DEVICES and FOUR FIGURED TABLES are not allowed.
3. Clarity, Neatness and Orderliness are highly encouraged.
4. Make sure all your answer scripts are stamped and signed.
5. Attach all extra sheets firmly. Avoid tearing any part of your answer sheets.
6. Do not forget to write your Olympiad seat number correctly on all your answer scripts.
7. Check your result with your Olympiad seat number on www.manlagosstate.com

DO NOT OPEN UNTIL YOU ARE TOLD TO DO SO.

PART A

1a. Find the value of x if $\frac{9^{2x-1}}{27^{x+1}} = 1$

b. Evaluate cos45°cos30° — sin30°, leaving your answer in surd form.

2a. If $f(x)$ = ax +b and $f^{-1}(x)$ =bx +a with a and b real numbers. What is the value of a+b?

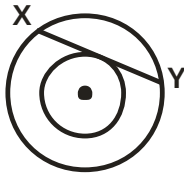
b. The two roots of the quadratic equation:

x^2 - 85x + c = 0 are prime numbers. What is the value of c?

3a. If the solution to $\frac{3}{\sqrt{7}-\sqrt{3}} + \frac{1}{\sqrt{7}-\sqrt{3}}$ is a$\sqrt{7}$ + b$\sqrt{3}$
Find the value of a and b.

b. Make t the subject of the formula in S = ut + ½at^2

4a. The two circles below are concentric. The radius of the large circle is 10cm and that of the small circle is 6cm. Find the length of the chord.



b. Resolve $\frac{3x+2}{x^2+x-2}$ into partial fraction

5a. Suppose that $\log_4 x = \frac{1}{3}$, what is the value of $\log_x 8$?

b. Let y = $\sqrt{x}\,(x+1)$. Find $\frac{dy}{dx}$.

PART B

1a. Simplify (1 + tan^2x)(1- Sin^2x)

b. The angle between the positive horizontal axis and a given line is 135°. Find the equation of the line if it passes through the point (2,3)

2a. If the mean and the variance of the numbers 1, 4, x, y and 10 is 6 and 4 respectively. Find the value of x and y.

b. List the elements of $\{x \mid -2 \leq x \leq 1\}$ $x \in \boldsymbol{Z}$

3a. Given the binary operation * defined for all m in $\boldsymbol{Z}$ and given by m*n = m^2 - mn + 30. Find the value of n if
7*n = 2

b. Chukwumerege can answer each question of 2016 and 2017 MAN Olympiad in 6 minutes while Kola can answer each in 1 minute. Suppose Kola rests for 2hours in the middle of answering the questions but Chukwumerege works all through the Olympiads without stopping. Suppose further that they both finished the test at the same time. How long did it take Chukwumerege to answer all the questions?
(Let n be the number of problems in the Olympiad questions).

b. The sum of a number and itself is thirty. Find the number.

5a. Pastor Martins wanted his ₦y to be shared among his children in the ratio of their ages. The last child is 3years old, the second child is 2years older than the last child while the first child is 3years older then the second child. If the last child received ₦45, find the total amount shared and the share of the other two children.

b. Arrange $\frac{5}{8}$, 0.8, 50%, $\frac{3}{4}$ and 0.3 in descending order.

Check your result with your Olympiad seat number on

April 30, 2018

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

2018 OLYMPIAD

CATEGORY: **PRIMARY**
DATE: MARCH 24, 2018
TIME: 2HRS

Instructions

1. Answer all the questions in PART A and PART B.
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PART A

1a. Simplify $\frac{\sqrt{2.25} \times \sqrt{20.25}}{10}$

b. Two numbers are in ratio 7:9, the smaller number is 42. What is the larger number?

2a. If the diameter of a semi circle is 14cm. Find its area. (Take $\pi = 3\frac{1}{7}$)

b. The middle number of five consecutive numbers is x and the sum of all the numbers is 100. Find the numbers.

3a. If $12_x = 6_{10}$. Find the value of x.

b. How long will it take ₦240 to amount to ₦360 at 20% per annum interest?

4a. Find the cost of polishing a circular table-top of diameter 1.6m, if the rate of polishing is ₦15/m^2. (Take π = 3.14)

b. Mrs. Okoilu left home at 5am, walking to the market at an average speed of 5kmh^{-1}, she reached the market at 7:30am of the same day. How far is the market from her home?

5a. Dr. Malik had ₦2, 100 left after spending 30% of the money he took for shopping. How much did he take to the market?

b. If $\frac{1}{6}$ of 90 oranges goes to Aboderin and $\frac{1}{5}$ of the remaining goes to Alo. What fraction of the oranges is left?

PART B

1a. Find the value of x if $\frac{x+2}{3} + \frac{x+1}{4} = x$

b. Add the LCM of 6, 20 and 25 to its HCF.

2a. A rectangle has length *pcm* and the breadth is less than the length by 1. If the perimeter of the rectangle is 22cm. Find the value of p.

b. Evaluate $\frac{3.2\ X\ 0.4}{0.016}$

3a. Find the diameter of a circle whose area is 1386cm^2 (Take $\pi = \frac{22}{7}$).

b. The angles of a quadrilateral are $(x+10)°$, $(x+35)°$, $x°$ and $(x+15)°$. Find the value of x.

4a. Find the area of the equilateral ABCD, where AC=22cm, BM=3cm, DN=3cm and BM⊥AC, DN⊥AC