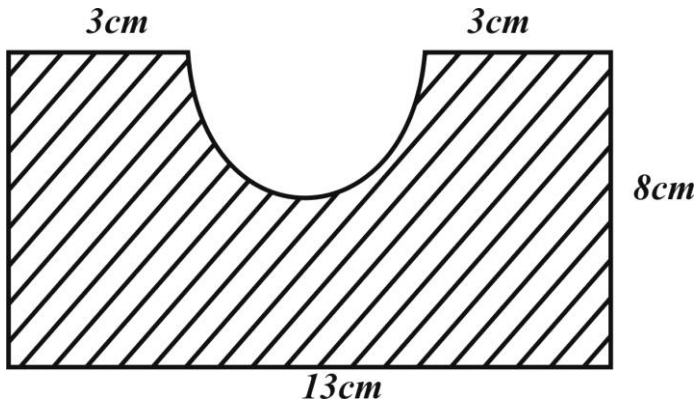
4. In an election between Dr. Malik and Mrs. Ladipo, Dr. Malik got 55% of the total valid votes, 20% of the total votes were invalid. If the total number of votes was 7,500, what is the number of valid votes that Mr. Olaitan got?
5. In the diagram below, the curve part is a semi-circle. Calculate the area of the shaded portion correct to 3 significant figures.



THE MATHEMATICAL ASSOCIATION OF NIGERIA (MAN)
(LAGOS STATE CHAPTER)
2020 OLYMPIAD
CATEGORY: PRIMARY
DATE: SATURDAY, MARCH 21, 2020
TIME 1HR 30MINUTES.

1. This paper consists of two parts, PART A and PART B. Answer all he questions in each part.
2. The use of CALCULATOR or any ELECTRONIC DEVICES and STATISTICAL TABLES are not allowed.
3. Make sure your invigilator sign your answer sheet.
4. There is no provision for extra answer sheet. Use your answer booklet wisely and do not tear any part of it.
5. Write your name, your school and your EXAMINATION number correctly on your answer sheet.
6. CLARITY, NEATNESS AND ORDERLINESS are highly encouraged. Do all your rough calculation at the last page of your answer sheet and cancel it before submission.
7. Check your result with your examination number on www.manlagosstate.com from Monday, May 11, 2020

DO NOT OPEN UNTIL YOU ARE TOLD TO DO SO

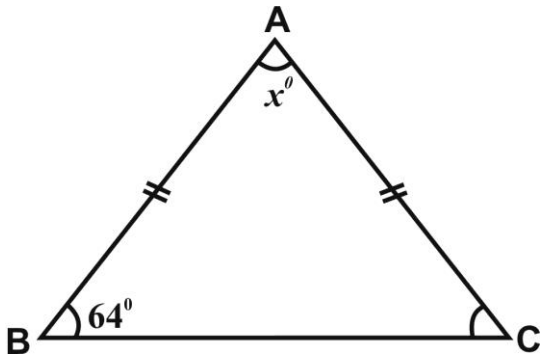
PART A

1a. List and find the sum of all the Prime numbers between 15 and 40

b. Find the difference between the square root of $\frac{81}{25}$ and the square of $\frac{4}{5}$

2a. Express 0.00000813 in a standard form.

b. Find the value of x in the diagram below



3a. Find the diameter of a circle whose area is 616m^2 (Take$\pi = \frac{22}{7}$)

b. A train traveled for 5 hours 20minutes at an average speed of 150km/hr. Calculate the distance covered by the train.

4a. Adekilekun received $\frac{3}{5}$ of a sum of money, Audu took $\frac{1}{3}$ of the remainder while Amarachi took the rest. If Amarachi's share is greater than Audu's share by N3, 000. How much did Adekilekun receive?

b. Simplify $\frac{3\frac{2}{3}\text{X} \quad 1\frac{1}{8}}{3\frac{2}{3} \quad - \quad 2\frac{1}{4}} \div \frac{5\frac{1}{2}}{3\frac{7}{9}}$

5a. Divide 25025 by 25

b. The hypotenuse side of a right angled triangle is 20cm while one of the other two sides is 16cm. Calculate the perimeter of the triangle.

PART B

1. Given that the mean of 4, 3, 6, 5, 7, 0, 1, 2, P, 6, and 4 is 4. Find the sum of the median and the mode of the data.

2. Solve for x if $\frac{2x+5}{x-2} = \frac{7}{3}$

3. The length of a square is increased by 20% while its breadth is decreased by 20% to form a rectangle. What is the ratio of the area of the rectangle to the area of the square?

PTO

5. Solve the equations graphically

$$5x + 7y = 12$$
$$3x - 2y = 1$$

For all values of x ranges from 0 to 3. Use 2cm to represent 1 unit on both axes.

THE MATHEMATICAL ASSOCIATION OF NIGERIA (MAN)

(LAGOS STATE CHAPTER)

2020 OLYMPIAD

CATEGORY: JUNIOR

DATE: SATURDAY, MARCH 21, 2020

TIME: 2HOURS

1. This paper consists of two parts, PART A and PART B. Answer all he questions in each part.
2. The use of CALCULATOR or any ELECTRONIC DEVICES and STATISTICAL TABLES are not allowed.
3. Make sure your invigilator sign your answer sheet.
4. There is no provision for extra answer sheet. Use your answer booklet wisely and do not tear any part of it.
5. Write your name, your school and your EXAMINATION number correctly on your answer sheet.
6. CLARITY, NEATNESS AND ORDERLINESS are highly encouraged. Do all your rough calculation at the last page of your answer sheet and cancel it before submission.
7. Check your result with your examination number on www.manlagosstate.com from Monday, May 11, 2020

DO NOT OPEN UNTIL YOU ARE TOLD TO DO SO

PART A

1a. Two angles are complementary. The larger angle is 15^0 more than twice the smaller angle. Find the measure of the smaller angle and the larger angle.

b. Simplify $(4.8 \times 10^{17}) \div (0.12 \times 10^4)$ and leave your answer in a standard form

2a. Simplify $\frac{3^{-5} \text{ X } 10^{-5} \text{ X } 125}{5^{-7} \text{ X } 6^{-5}}$

b. Factorise $8y - 32y^3$

3a. A rectangular pool 20 meters wide and 60 meters long is surrounded by a walkway of uniform width. If the total area of the walkway is 516 square meter, how wide, in meter is the walkway?

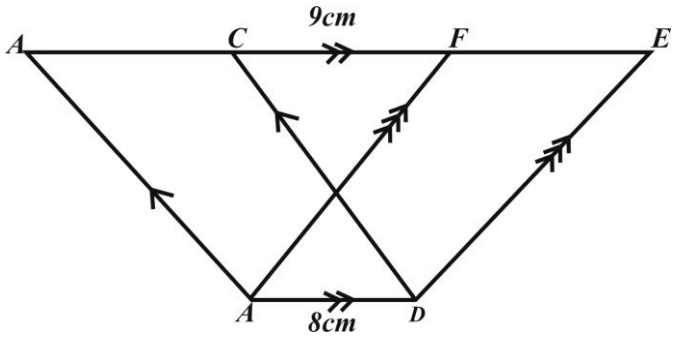
b. x is partly constant and partly varies as y, when x is 30, y is 2 and when y is 6, x is 50. Find the value of x when y is 3.

4a. A business man invested a total of N200, 000.00 in two companies which paid dividends of 5% and 7% respectively. If he received a total of N11, 600.00. How much did he invest at 7%?

b. At a bookstore, two binders and three pens cost N12.50, while three binders and five pens cost N19.50. Find the cost of a binder and a pen.

5a. Afolabi rolled a die once. What is the probability of obtaining a prime number?

b. In the diagram below, AD = 8cm, CF = 9cm. if the area of the parallelogram ABCD is $48cm^2$, find the area of the trapezium ABED.



PART B

1. The graph of $y = 2px^2 - p^2x - 14$ passes through the point (3,10), find the values of P.

2. Simplify $\log_2 [\log_2(\log_2 16)]$

3. Solve the inequality and illustrate your answer on a number line.

$$7(x + 4) - \frac{2}{3}(x - 6) \leq 2[x - 3(x + 5)]$$

4. Simplify $5\sqrt{12} + 4\sqrt{72} - 3\sqrt{18} + 2\sqrt{75}$ **PTO**

5. a. Copy and complete the table of values for

$y = 2x^2 + x - 10$ for $-5 \leq x \leq 4$

x	-5	-4	-3	-2	-1	0	1	2	3
y			5		-9	-10		0	

b. Using the scales of 2cm to 1 unit on the x axis and 2cm to 5 units on the y axis, draw the graph of

$y = 2x^2 + x - 10$ for $-5 \leq x \leq 4$

c. Use the graph to find the solution of:

(i.) $2x^2+x=10$ (ii.) $2x^2+x-10=2x$

THE MATHEMATICAL ASSOCIATION OF NIGERIA (MAN)

(LAGOS STATE CHAPTER)

2020 OLYMPIAD

CATEGORY: SENIOR

DATE: SATURDAY, MARCH 21, 2020

TIME: 2HOURS

1. This paper consists of two parts, PART A and PART B. Answer all he questions in each part.
2. The use of CALCULATOR or any ELECTRONIC DEVICES and STATISTICAL TABLES are not allowed.
3. Make sure your invigilator sign your answer sheet.
4. There is no provision for extra answer sheet. Use your answer booklet wisely and do not tear any part of it.
5. Write your name, your school and your EXAMINATION number correctly on your answer sheet.
6. CLARITY, NEATNESS AND ORDERLINESS are highly encouraged. Do all your rough calculation at the last page of your answer sheet and cancel it before submission.
7. Check your result with your examination number on www.manlagosstate.com from Monday, May 11, 2020

DO NOT OPEN UNTIL YOU ARE TOLD TO DO SO

@ MAN LAGOS STATE 2020

PART A

1a. How many numbers between 75 and 500 are divisible by 7?

b. If $2^x = y$ then evaluate $\log_2 \frac{1}{y}$

2a. Find the equation of the straight line which passes through the points X(3, -4) and Y(-5, 2).

b. If $x^2 + 2x - 3x\sqrt{x} = 0$. What are the values of x.

3a. Using the substitution of $U = cos\ x$ or otherwise. Find $\int cos^5 x sinx dx$.

b. Prove that $1 - \frac{\sin\theta tan\theta}{1 + sec\theta} = \cos\theta$

4a. Among a set of 5 black balls and 3 red balls, how many selections of the 5 balls can be made such that at least 3 of the balls are black?

b. The base area of a triangle is 3cm longer than its height. If the area of the triangle is 44cm^2, find the length of its base.

5a. If the solution to $\frac{5 + \sqrt{6}}{\sqrt{3} - \sqrt{2}} = a\sqrt{3} + b\sqrt{2}$. Find the value of a and b where both a and b are integers.

b. Prove by mathematical induction that $1^3 + 2^3 + 3^3 + \cdots + n^3 = \frac{1}{4}(n^2)(n+1)^2$

PART B

1. The three consecutive terms of a geometric series are the first, second and seventh term of an arithmetic series. Find the value of the common ration.

2. 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 $\sqrt{4^{2^{2^x}}}$

3. Simplify $\int \frac{s^2+1}{s^2-1} ds$

4. The lengths of the legs of a right angled triangle are x and y, while the length of the hypotenuse is $x + y - 4$. Find the maximum radius of a circle inscribed in the triangle.