

**PRESIDENT'S OFFICE REAGIONAL ADMINISTRATION AND LOCAL  
GOVERNMENT  
UKEREWE DISTRICT ANNUAL JOINT EXAM 2024  
FORM THREE  
BASIC MATHEMATICS**

**TIME: 3 HOURS**

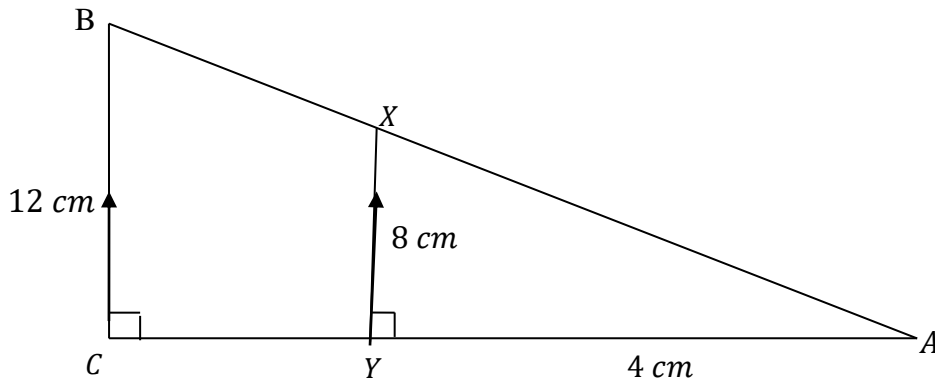
**INSTRUCTIONS**

1. This paper consists of sections **A**, and **B** with total of fourteen (**14**) questions.
2. Answer **all** questions in sections **A** and **B**.
3. Non –programmable calculator and mathematical tables may be used.
4. All writings must be in **black** or **blue** ink except diagrams which must be in Pencil.
5. Cellular phones and any unauthorized materials are not allowed in the examination room.

**SECTION A (60 MARKS)**

Answer **all** questions in this section.

1. (a) Premier School comprises of nursery, primary and secondary schools. Nursery school bell period rings after every 20 minutes, primary school bell period rings after every 30 minutes while secondary school bell period rings every after 40 minutes. If all the bells start rings together at 8:00 am, at what time will they again ring together?  
 (b) Express  $0.6666666666 \dots$  in form of  $\frac{a}{b}$  where a and b are integers and  $b \neq 0$
2. (a) Find the value of  $n$   $6(2^{n+1}) - 3(2^{n-1}) = 10.5$   
 (b) Solve for  $x$  given that  $\log(3x + 17) = \log(x + 1) + 1$
3. (a) In a village of 1200 people, all the people speak Kiswahili (K) or English (E) or both. Among them 97% speak Kiswahili and 64% speak English, by letting on represent the percentage of people who speak both Kiswahili and English, find the number of people who speak English only.  
 (b) Given that  $P = \{\text{Multiples of 4 less than 24}\}$  and  $Q = \{\text{Even numbers between 10 and 22}\}$ . Find all subsets of a set  $P \cap Q$
4. (a) A straight line P is passing through point (3, 4) and having the same slope with a straight line Q  $3x + 2y = 4$ . Find the equation of a line P.  
 (b) Find the image of a point (5, 6) after a reflection on a line  $y = -x$
5. (a) The interior angle of a regular polygon is four times the exterior angle. Find the number of sides of the polygon and hence name the polygon.  
 (b) In the figure below  $\overline{XY} = 8 \text{ cm}$ ,  $\overline{BC} = 12 \text{ cm}$  and  $\overline{AY} = 4 \text{ cm}$ , show that  $\Delta AXY \sim \Delta ACB$  and calculate the area of triangle ABC.



6. (a) Anna walks  $24 \text{ km}$  every day. Compute in metres, the distance she walks in 2 days.  
 (b) Bakari decided to sponsor five people to attend a meeting at Dubai for five days, if cost of living of each person for a day is 50 US dollars, he planned to offer them total of Tsh 3.6 million to be distributed equally to them. But when they were coming back some decided to exchange the remaining money into US dollars and some exchange their remaining money into UK pounds.  
 ( If 1 US dollar = Tsh 2350 and 1 UK pound = Tsh 2860 )  
 (i) Find the remaining money for each who preferred US dollars  
 (ii) Find the remaining money for each who preferred UK pounds

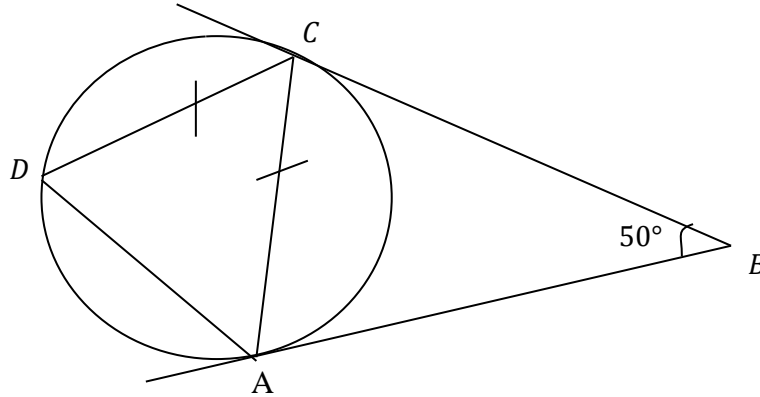
7. (a) At Kingalu market in Morogoro, the ratio of men to women is 7:12. If there are present 1380 women, find the number of men in the market.  
 (b) Given that  $a : b = 4 : 9$  and  $b : c = 6 : 11$ , find the values of  $a, b$  and  $c$ .
8. (a) Given the series  $1 + 2 + 3 + 4 + 5 + \dots + 99 + 100$ . If the multiple of 3 are selected from the series, find the sum of the resulting series.  
 (b) With reason state whether the series  $1 - \frac{1}{3} + \frac{1}{9} - \dots - \frac{1}{243}$  is an arithmetic progression or a geometric progression and hence find the number of its terms.
9. (a) Given that  $13\sin \theta = 5$ , where  $\theta$  is an acute angle, without using mathematical tables, find the value of  $\frac{1}{\sin^2 \theta} + \frac{1}{\cos^2 \theta}$   
 (b) A bus and a car are parked on the same straight line in front of a building. A man on top of the building notices that the angles of depression of a bus and the car are  $45^\circ$  and  $30^\circ$  respectively. If the bus is parked 30 metres in front of the building, determine the distance between two vehicles.
10. (a) If  $kx^2 + 24x + 16 = 0$  is a perfect square, find the value of  $k$  and hence factorize.  
 (b) Solve for the equation  $3x^2 = 7x + 6$  by completing the square method.

### SECTION B (40 MARKS)

Answer **all** questions from this section.

11. The number of passengers attended for the bus stand daily during COVID- 19 season were recorded as follows:
- |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| 51 | 61 | 42 | 27 | 49 | 44 | 56 | 36 | 24 | 40 | 48 | 67 | 30 | 46 | 72 |
| 63 | 43 | 76 | 48 | 55 | 38 | 58 | 60 | 51 | 47 | 68 | 33 | 39 | 73 | 53 |
- (a) Prepare the frequency distribution table to illustrate the number of passengers with the class width of 10 starting with the smallest number of passengers.  
 (b) Calculate the mean by assumed mean (A) method, use A as the class mark of the modal class  
 (c) Calculate the mode number of passengers  
 (d) Draw a cumulative frequency curve and hence use it to estimate median number of passengers
12. (a) An airplane take off from Arusha ( $5^\circ\text{S}, 33^\circ\text{E}$ ) to Tanga ( $5^\circ\text{S}, 39^\circ\text{E}$ ) at a speed of  $332\text{ km/hr}$ .  
 If it leaves Arusha at 600 Hours,  
 (i) Find the distance between Arusha and Tanga  
 (ii) At what time will it arrive in Tanga?

- (b) From the circle given below, find the size of angles  $D\hat{A}C$ ,  $A\hat{C}D$  and  $A\hat{C}B$  if  $\overline{AB}$  and  $\overline{BC}$  are tangents of the circle.



13. Given that  $f(x) = \begin{cases} x + 2 & \text{if } -2 > x \\ x^2 + 1 & \text{if } -2 \leq x < 2 \\ 1 & \text{if } 2 \leq x \end{cases}$

- Sketch the graph of  $f(x)$
  - Use it to state the domain and range of  $f(x)$ .
  - Use the graph to find the value of  $f(2)$ ,  $f(-2)$  and  $f(0)$
  - With a reason(s), state whether a function  $f(x)$  is one-to-one or not
14. Halima started a business on 1<sup>st</sup> September, 2018 with a capital of Tshs. 25, 000/= in cash.

- September
- Bought goods for cash 15, 000/=
  - Sold goods for cash 3, 000/=
  - Sold goods for cash 5, 000/=
  - Paid carriage on goods 5, 000/=
  - Sold goods for cash 14, 000/=
  - Bought goods for cash 1, 000/=
  - Paid rent 2, 000/=
  - Purchased goods for cash 6, 000/=
  - Paid wages 5, 000/=
  - Sold goods on credit 1, 000/=

By using these transactions,

- Prepare the cash account
- Prepare the trial balance
- Write down the one use of (a) and two uses of (b) above