

**Uganda Martyrs S.S Namugongo**

**S.3 COVID- 19 MATHS - 2020**

**SET 1**

1. Find m if  $(1*3)*m = 18$ , given that  $a * b = a^2 + b^2$
2. Factorize the expression  $x^2 - y^2$  and hence evaluate  $(10003)^2 - (9997)^2$
3. Solve for n if:  $\left(\frac{3}{5}\right)^{n-1} = \left(\frac{25}{9}\right)^n$
4. If  $\log 2 = 0.30103$  and  $\log 3 = 0.4771$ , evaluate  $\log 48$
5. Find the value of y given that  $1 + \log_2 3 + \log_2 y = \log_2 12$ .
6. Find the greatest number which divides onto 364, 404 and 244 leaving a remainder 4 in each case.
7. In a class the ratio of boys to girls is 4:5. One day  $\frac{1}{4}$  of the girls were absent and  $\frac{1}{5}$  of the boys were absent. If 5 more students had been absent then  $\frac{1}{3}$  of the class would have been absent. How many students were in the class?
8. Angle A is acute and  $\tan A = 2.4$ . Find in the simplified form the value of  $\frac{2 \cos A + \sin A}{\sin A - \cos A}$
9. A sum of money was divided among A, B and C such that A gets 30% of the whole .B gets 60% of the remainder and C got the rest. If C got shs. 10,000, how much was divided.
10. Solve  $\frac{2g + 6}{2} - \frac{g - 2}{3} = 7$
11. Express the numbers 5148 and 6084 each as product of its prime factors. Hence find evaluate  $\frac{(5148)^2}{6084}$  leaving your answer as a product of its prime factors
12. Find the value of y in the following equation  $25^{y-1} + 5^{2y} = 130$ .
13. Make k the subject of the formula.  $t = \frac{2w}{z} \sqrt{\frac{f-a}{3k}}$

## SET 2

- In a certain school, 45 students are chosen to participate in a mathematics contest and the ratio of girls to boys is 2:7. Find the number of girls required to join the group so that the ratio of girls to boys is changed to 4:5
- Given the inequalities  $\frac{1}{3}x + 2 \leq x + 5 \leq 3x - 1$ 
  - Solve the inequalities
  - Represent the solution on a number line
- A quantity K is partly constant and partly varies as M. When  $K = 45, M = 20$ , and when  $K = 87, M = 48$ 
  - Find the formulae connecting K and M
  - Find K when  $M = 36$
- Determine the equation of a line passing through  $(-1, 3)$  and parallel to the line whose equation is  $3x - 5y = 10$
- Two similar pentagonal based pyramids have surface areas  $200 \text{ cm}^2$  and  $50 \text{ cm}^2$  respectively. The volume of the larger pyramid is  $800 \text{ cm}^3$ . Show that the volume of the smaller pyramid is  $100 \text{ cm}^3$ .
- Solve the simultaneous equations: 
$$\begin{cases} 3x - 5y = 18 \\ 4x + 2y = 11 \end{cases}$$
 by matrix method.
- The marked price of a pair of shoes is Sh. 2400. A customer buys the shoes and is offered a 10% discount and the seller still makes a profit of 20% on the cost of the shoes. Determine the cost price.
- Given that  $\begin{pmatrix} a-1 & a+1 \\ 3a & a \end{pmatrix}$  is a singular matrix, find the possible values of x.
- Given that  $f(x) = \frac{1}{x+2}$  and  $g(x) = \frac{x+2}{x}$  evaluate  $fg(2)$
- The variable v varies directly as the square of x and inversely as y. Find when  $x=5$ ; given that when the value of  $y = 28, v = 1, x=3, y=4$

### SET 3

1. The vertices of quadrilateral ABCD are A (2, 4), B (-1, 5), C (-3, 4) and D (-2, 2).
  - a) Calculate the gradient of line CD.
  - b) Show that line AD is perpendicular to line CD.
  - c) Find the equation of line CD. Give your answer in the form  $ax + by - c = 0$ .

Lines AB and CD intersect at point E.
  - d) Find the coordinates of E.
  - e) Find the distance between A and D.
  - f) The distance between D and E is  $\sqrt{20}$ .
  - g) Find the area of triangle ADE.
2. Out of three newspapers: The Chronicle, The Express and Moon, and The Scribe. It was found that in one city;  
35% of the town's population read The Chronicle,  
42% read The Express and Moon,  
51% read The Scribe,  
4% read The Chronicle and The Express and Moon only,  
10% read The Chronicle and The Scribe only,  
15% read The Express and Moon and The Scribe only, and  
7% of the population reads all three newspapers.
  - a) Draw a Venn diagram to represent this information. Label A the set that represents The Chronicle readers, B the set that represents The Express and Moon readers, and C the set that represents The Scribe readers.
  - b) What percentage of the population does not read any of the three newspapers?
  - c) Find the percentage of the population that reads exactly one newspaper.
  - d) Find the percentage of the population that reads The Chronicle or The Express and Moon but not The Scribe.

### SET 4

1. (a) Jacob is now twice as old as his son. Twenty years ago, the product of their ages was 750. Determine the present age of Jacob and his son.

(b) Given that  $R = \sqrt{\frac{gd^3}{w}}$  make  $d$  the subject of the formula. Hence find the value of  $d$  when  $R=50$ ,  $M=8$  and  $t=0.4$  .

2. Four towns **P**, **R**, **T** and **S** are such that **R** is on a compass direction  $S30^\circ E$  and 70km from **P**. The point **T** is on a bearing of  $055^\circ$  from **P** and directly north of **R**. Town **S** is on a bearing of  $290^\circ$  from **T** at a distance of 50 km.

a) Using a scale of 1cm to represent 10km, make an accurate scale drawing to show the relative position of the towns.

b) Find:

(i) The distance and the bearing of **R** from **S**

(ii) The distance and the bearing of **S** from **P**

(iii) The distance of **P** from **T**

3. Using a ruler, a pencil and a pair of compasses only:

a) Construct a triangle **PQR** in which  $PQ = QR = 7.4\text{cm}$  and angle  $PQR = 105^\circ$

b) Measure and state the length of **PR** and angle  $PRQ$ .

c) Construct a perpendicular line from point **P** to meet **RQ** produced at **N**. Also locate points **S** on **PN** produced such that  $PR = SR$

(i) Measure and state the length of  $\overline{PS}$

(ii) Draw an inscribed circle of the  $\triangle PRS$  and hence state the radius of the circle.

4. Express  $y^2 + 4y - 32$  in the form  $(y + p)^2 + q$

Hence, solve the equation  $y^2 + 4y - 32 = 0$ .

b). Given that  $f(x) = \frac{x+5}{2}$  and  $g(x) = \frac{1-2x}{2}$ , determine the values of  $x$  for which

$$fg(x) = \frac{x^2 + 2x - 20}{6}$$