THE UNITED REPUBLIC OF TANZANIA
PRESIDENT'S OFFICE
REGIONAL ADMINISTRATION AND LOCAL GOVERNMENT
KIGAMBONI DISTRICT JOINT EXAMINATION

FORM TWO
041 BASIC MATHEMATICS

Time: 2½ Hours **Wednesday, 14th May 2025 a.m.**

Instructions

1. This paper consists of a total of 10 questions.
2. Attempt all questions.
3. Each question carries 10 marks.
4. Mathematical tables and non-programmable calculators are not allowed
5. Write your examination number on every page of your answer sheets

FOR EXAMINER'S USE ONLY		
QUESTION NUMBER	**SCORE**	**EXAMINER'S INITIALS**
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
TOTAL		
CHECKER'S INITIALS		

1. (a) Change $1.8\dot{3}$ into simple fraction

(b) Given 0.080579

i. Write to 3 decimal places

ii. Write to 3 significant figures

(c) Find the sum of the LCM and GCF of all prime numbers between $80 - 90$

2. (a) A village has a population of 8 750 989. If youth population is 2 099 489, round off adults' population to the nearest hundred thousand.

(b) If $m = 0.\dot{2}$ and $m = 0.040404...$ show that $m^2 = n\left(m + \frac{7}{7}\right)$

3. (a) The weight of the mother and her daughter is 112kg 70g. Find the weight of the mother if the daughter weighs 35kg 59dag (leave the answer in kg and g)

(b) The ratio of the number of girls to that of boys at Seypalm Secondary School is 12:5. If the number of boys is 11 380, find:

(i) The number of girls

(ii) Total number of students in the school

4. (a) Calculate angle A in the following figure:

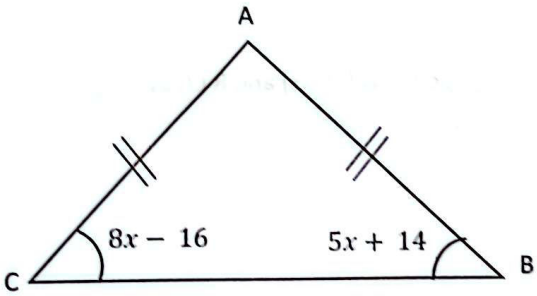


Figure 1

(b) Find the circumference of a quarter of a circle whose diameter is 14 cm.

5. (a) Completely factorize the following:

(i) $25 - 5x - 2x^2$

(ii) $81a^2 - 1$

(b) Solve $x^2 - 7x + 10 = 0$ by General formula

6. (a) Find equation of a line passing through points Q (-2, -1) and R (3, 9).

(b) In what quadrant is point Q (2, -7) located on xy plane and determine the consecutive point to point Q on x-axis to the right where points are integers.

7. (a) Solve: $(2^{x+y})(3^{2x-y}) = 96$

(b) Rationalize the denominator: $\frac{1}{(\sqrt{5}-\sqrt{3})^2}$

8. Simplify the following:

(a) Simplify: $\frac{3^{3001} \times 5^{3003}}{15^{3002}}$

(b) Solve: $\log x = \log 9 + \log 5$

(i) $\left(\frac{2}{9}\right)^4 \times \left(\frac{81}{4}\right)^3$

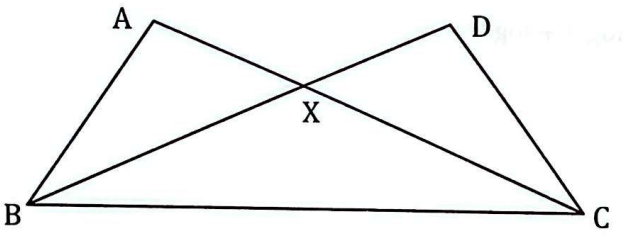
(ii) $\frac{10^{-3} \times 10^{-4}}{10^{-11} \times 10^{-2}}$

9. (a)Graph the solution of $|7 - 3x| \leq 2$

(b) Find the simple interest earned on deposit of 4 million in a bank that offers a rate of 5% per annum after 2 years.

(c) In the following figure $BAC \cong \Delta CDB$, $\angle ABC = \angle DCB$ *and* $\overline{AX} = \overline{DX}, \overline{BX} = \overline{CX}$, prove that $\angle BAC = \angle CDB$

Figure 2



10. (a) Solve the following simultaneous equation:

$$\begin{cases} 3x - 2(y - 4) = 16 \\ -5y + 6x = 17 \end{cases}$$

(b) The legs of triangle PQR are 18 cm, 19 cm and 17 cm respectively. Find the area of a square whose perimeter is the same as that of triangle PQR.

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MARKING SCHEME MAY 2025

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1. (a) let $y = 1.8\dot{3}$

$y = 1.83\dot{3}$

……..……....equation 1

$10y = 1.8\dot{3} \times 10 = 18.3\dot{3}$

……..……equation 2

Subtract equation 1 from equation 2

$$-\left|\begin{matrix} 10y = & 18.3\dot{3} \\ y = & 1.8\dot{3} \end{matrix}\right.$$ ----------.------01 mark

$9y = 16.5$ ……01 mark

$\frac{9y}{9} = \frac{16.5}{9}$

$y = \frac{16.5 \times 10}{9 \times 10}$

$= \frac{165}{90}$……01 mark

$= \frac{165 \div 15}{90 \div 15}$

$= \frac{11}{6}$……01 mark

(b) i $0.080579 \approx 0.081$ ……$1\frac{1}{2}$ marks

ii. $0.080579 \approx 0.0806$ ……$1\frac{1}{2}$ marks

(c) Prime numbers are 83 and 89……..…..……01 mark

$83 = 1 \times 83$

$89 = 1 \times 89$

GCF $= 1$ *and* $LCM = 7387$……..01 mark

Sum of the GCF and LCM $= 1 + 7387$

$= 7388$……01 mark

2. (a) Adult population = village population −youth population

$= 8\,750\,989 - 2\,099\,489$……..01 mark

$= 6\,651\,000$……02 marks

Therefore adult population is about 6 700 000 people……02 marks

(b) $m = 0.\dot{2}$

$10m = 0.2 \times 10 = 2.\dot{2}$……..…00$\frac{1}{2}$mark

$$-\left|\begin{matrix} 10\,m = & 2.\dot{2} \\ m = & 0.\dot{2} \end{matrix}\right.$$

$9m = 2$……..……$00\frac{1}{2}$mark

$$\frac{9m}{9} = \frac{2}{9}$$

$m = \frac{2}{9}$……..……..……..$00\frac{1}{2}$ mark

$$n = 0.\dot{0}\ddot{4}$$

$100\,n = 0.\dot{0}\ddot{4} \times 100 = 4.\dot{0}\ddot{4}$…….……..…$00\frac{1}{2}$mark

$$-\left|\begin{matrix}100\,n = 4.\dot{0}\ddot{4}\\ n = 0.\dot{0}\ddot{4}\end{matrix}\right.$$

$99\,n = 4$……$00\frac{1}{2}$mark

$$\frac{99n}{99} = \frac{4}{99}$$

$n = \frac{4}{99}$.……$00\frac{1}{2}$mark

From $m^2 = n\left(m + \frac{5}{5}\right)$ *is the same as* $m^2 = n(m+1)$

$\left(\frac{2}{9}\right)^2 = \frac{4}{99}\left(\frac{2}{9} + 1\right)$……..……$00\frac{1}{2}$mark

$\frac{4}{81} = \frac{4}{99} \times \frac{11}{9}$……..……$00\frac{1}{2}$ mark

$\frac{4}{81} = \frac{4}{81}$.……..……$00\frac{1}{2}$mark

Since LHS= RHS hence shown…….……$00\frac{1}{2}$mark

3. (a) Mother's weight = Total weight − daughter's weight

	kg	g
=	112	70
-	35	590
	76	480

……....02 marks

But 1 dag = 10 g

59 $dag = y$

$$y = \frac{59dag \times 10g}{1\,dag}$$

$= 590\ g$ ……..……..…….01 mark

Therefore, the mother's weight is 76 kg 480 g ……..……02 marks

(b)i. Let the number of girls be y

$12 : 5 = y : 11\,380$……..……...01 mark

$y = \frac{12 \times 11\,380}{5}$……...02 mark

$$= 12 \times 2\,276$$

$= 27\,312$……..…….02 mark

Therefore, the number of girls is 27 312

ii. Total number of students = number of girls + number of boys

$= 27\,312 + 11\,380$……02 marks.

$= 38\,692$……..…..……03 marks

4. (a)$8x - 16 = 5x + 14$ (Base angles of isosceles triangle) …01 mark

$8x - 5x = 14 + 16$

$3x = 30$……………………………………………………………01 mark.

$$\frac{3x}{3} = \frac{30}{3}$$

$x = 10$ ………………………………………………………..……01 mar

$5x + 14 = 5 \times 10 + 14 = 64^{\circ}$……………………………………01 mark

$$\angle A = 180^{\circ} - (64^{\circ} \times 2)$$

$= 52^{\circ}$……………………………………………………..…………01 mark.

(b) $c = \frac{2\pi}{4}r + 2r$…………………………………………………….01 mark.

$$= \frac{\pi r}{2} + 2r$$

$= \frac{22}{7} \times \frac{7}{2} + 2 \times 7$…………………………………………………..01 mark

$= 11 + 14$………………………………………………………...01 mark

$= 25\ cm$………………………………………………………..01 mark

5. (a) i. Factors are$(-10, 5)$ and product is -50

$25 - 5x - 2x^2 = 25 - 10x + 5x - 2x^2$………………………01 mark

$= -2x(x + 5) + 5(x + 5)$…………………..…01 mark

$= (x + 5)(-2x + 5)$…………………………01 mark

ii. $81a^2 - 1 = (9a)^2 - (1)^2$ ………………………………01 mark

$= (9a - 1)(9a + 1)$……………………..….01 mark

(b) Let the cost one tie be $x\ and\ y\ for\ shirt$

$$83\,000 - (2x + 2y) = 9\,000$$

$$2x + 2y = 83\,000 - 9\,000$$

$$2x + 2y = 74\,000$$

$x + y = 37\,000$……………………………………………equation 1

$$83\,000 - (x + 3y) = 0$$

$x + 3y = 83\,000$ ………………….,,.……equation 2

Solve equation 1 and 2 by elimination method

$$-\left| \begin{array}{l} x + 3y = 83\,000 \\ x + y = 37\,000 \end{array} \right.$$

$2y = 46\,000$ …………………………………………………01 mark

$$\frac{2y}{2} = \frac{46\,000}{2}$$

$y = 23\,000$ ……………………………………………………..…01 mark

Substitute 23 000 for y in equation 1

$$23\,000 + y = 37\,000$$

$$y = 37\,000 - 23\,000$$

$y = 14\,000$………………………………………………..……01 mark

Therefore, the price of each shirt is 23 000 Tanzanian shillings and the price of each tie is 14 000 Tanzanian shillings………………………01 mark

6. (a) $m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{9+1}{3+2} = \frac{10}{2} = 2$ .....02 marks

$2 = \frac{y+1}{x+2}$ .....01 mark

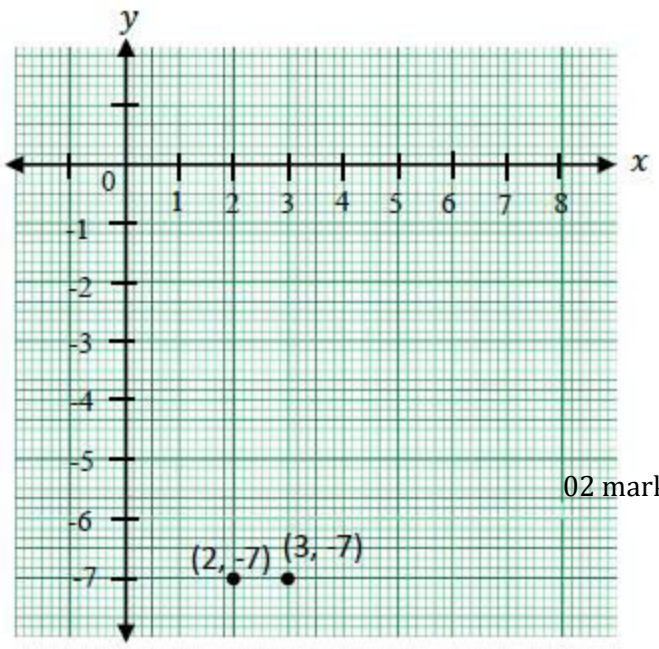
$2x + 4 = y + 1$

$2x + 3 = y$ .....01 mark

$y = 2x + 3$

y - Intercept = c = 3.....01 mark

(b)



02 marks

The point (2, -7) is in the fourth quadrant .....01 mark

The consecutive point to point Q (2, -7) to the right is (3, -7).....02 marks

7. (a) $(2^{x+y})(3^{2x-y}) = (2^5 \times 3^1)$

$2^{x+y} = 2^5$ and $3^{2x-y} = 3^1$ .....02 marks

$x + y = 5$---------- (i)

$2x - y = 1$---------- (ii)

Solve equation (i) and (ii) by elimination method

$+\left|\begin{matrix} x + y = 5 \\ 2x - y = 1 \end{matrix}\right.$

$3x = 6$

$\frac{3x}{3} = \frac{6}{3}$

$x = 2$ .....01 mark

Substitute 2 for x in $x + y = 5$

$2 + y = 5$

$y = 5 - 2$

$y = 3$ .....01 mark

(b)

$\frac{1}{(\sqrt{5}-\sqrt{3})^2}=\frac{1}{(\sqrt{5}-\sqrt{3})(\sqrt{5}-\sqrt{3})}$ .....01 mark

$=\frac{1}{5-\sqrt{15}-\sqrt{15}+3}$ .....01 mark

$=\frac{1}{5+3-2\sqrt{15}}$

$=\frac{1}{8-2\sqrt{15}}$ .....01 mark

$\frac{1}{8-2\sqrt{15}}=\frac{1}{8-2\sqrt{15}}\times\frac{8+2\sqrt{15}}{8+2\sqrt{15}}$ .....01 mark

$=\frac{8+2\sqrt{15}}{64+16\sqrt{15}-16\sqrt{15}-4\times 15}$

$=\frac{8+2\sqrt{15}}{64-60}$ .....01 mark

$=\frac{8+2\sqrt{15}}{4}$

$=2+\frac{\sqrt{15}}{2}$ .....01 mark

8. $\frac{3^{3001}\times 5^{3003}}{15^{3002}}=\frac{3^{3001}\times 5^{3001}\times 5^2}{15^{3001}\times 15^1}$

$=\frac{(3\times 5)^{3001}\times 5^2}{15^{3001}\times 15^1}$.....00$\frac{1}{2}$mark

$=\frac{15^{3001}\times 5^2}{15^{3001}\times 15^1}$.....01 mark

$=\frac{5^2}{15^1}=\frac{25\div 5}{15\div 5}$

$=\frac{5}{3}$.....01 mark

Alternative

$\frac{3^{3001}\times 5^{3003}}{15^{3002}}=\frac{3^{3001}\times 5^{3003}}{(3\times 5)^{3002}}$

$=\frac{3^{3001}\times 5^{3003}}{3^{3002}\times 5^{3002}}$.....00$\frac{1}{2}$mark

$=\left(\frac{3^{3001}}{3^{3002}}\right)\left(\frac{5^{3003}}{5^{3002}}\right)$

$=\left(3^{(3001-3002)}\right)\left(5^{(3003-3002)}\right)$.....01 mark

$=3^{-1}\times 5^1$

$=\frac{5}{3}$.....01 mark

(b)$\log y=\log 9+\log 5$

$= \log(9 \times 5)$……$00\frac{1}{2}$mark

$= \log 45$……..01 mark

Therefore $y = 45$……..01 mark

(i) $\left(\frac{2}{9}\right)^4 \times \left(\frac{81}{4}\right)^3 = \left(\frac{2}{9}\right)^4 \times \left(\frac{9^2}{2^2}\right)^3$ ……..01 mark

$= \left(\frac{2}{9}\right)^4 \times \left(\left(\frac{9}{2}\right)^2\right)^3$

$= \left(\frac{2}{9}\right)^4 \times \left(\frac{9}{2}\right)^6$ ……..00½ mark

$= \left(\frac{9}{2}\right)^{-4} \times \left(\frac{9}{2}\right)^6$

$= \left(\frac{9}{2}\right)^{(-4+6)}$ ……..01 mark

$= \left(\frac{9}{2}\right)^2$ or $\left(\frac{2}{9}\right)^{-2}$ ……..01 mark

(ii) $\frac{10^{-3} \times 10^{-4}}{10^{-11} \times 10^{-2}} = \frac{10^{-3+-4}}{10^{-11+-2}}$

$= \frac{10^{-7}}{10^{-13}}$ ……..00½ mark

$=10^{(-7--13)}$ ……..00½ mark

$= 10^{-7+13}$ ……..00½ mark

$= 10^6$ ……..01 mark

9. (a)

$\pm(7 - 3x) \leq 2$

$7 - 3x \leq 2$ or $-7 - 3x \leq 2$……..01 mark

$-2 + 7 \leq 3x$ or $-7 + 7 + 3x \leq 2 + 7$

$7 - 2 \leq 3x$or$3x \leq 9$

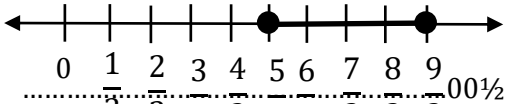
$5 \leq 3x$or$3x \leq 9$

$\frac{5}{3} \leq \frac{3x}{3}or\frac{3x}{3} \leq \frac{9}{3}$

$\frac{5}{3} \leq x$ or $x \leq 3$ ……..01 mark

$x \geq \frac{5}{3}$ ….01 mark

$\frac{5}{3} \leq x \leq 3$



01 mark

(b) I $= \frac{PRT}{100}$ ……..00½ mark

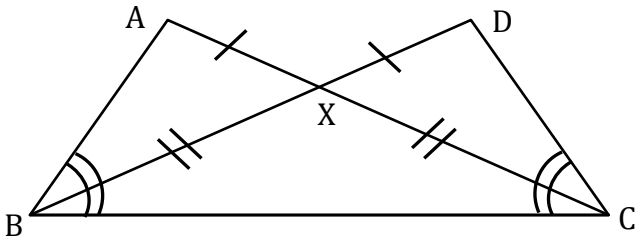
$= 4\ 000\ 0\cancel{00} \times \frac{5}{\cancel{100}} \times 2$ ……..00½ mark

= 40 000 Shillings ……..01 mark

∴ I = 40 000 Shillings .....01 mark

(c)Solution

Figure 3



$\overline{AX} = \overline{DX}$ (Given)..... $00\frac{1}{2}$ mark

$\overline{BX} = \overline{CX}$(Given) .....$00\frac{1}{2}$ mark

$\overline{BC} = \overline{BC}$ (Is common) .....$00\frac{1}{2}$ mark

$\angle ABC = \angle DCB$ (Given)..... $00\frac{1}{2}$ mark

Therefore $\angle BAC = \angle CDB$(ASA axioms) .....01 mark

10. (a)

$$\begin{cases} 3x - 2\,(y - 4) = 16 \\ -5y + 6x = 17 \end{cases}$$

$$\begin{cases} 3x - 2y = 8 & \text{(i)} \\ -5y + 6x = 17 & \text{(ii)} \end{cases}$$ .....01 mark .....01 mark

Solve equation (i) and (ii) by elimination method

$2(3x - 2y = 8)$

$6x - 5y = 17$

$6x - 10y = 16)$

$6x - 5y = 17$

$$-\left|\begin{matrix} 6x - 10y = 16 \\ 6x - 5y = 17 \end{matrix}\right.$$ .....01 mark

$y = -1$

Substitute -1 for y in $3x - 2y = 8$

$3x - 2(-1) = 8$ .....01 mark

$3x + 2 = 8$

$3x + 2 - 2 = 8 - 2$

$3x = 6$

$\frac{3x}{3} = \frac{6}{3}$

$x = 2$ .....01 mark

(b) Perimeter of Δ PQR = $S_1 + S_2 + S_3$

.....01 mark

= 18 cm + 19 cm + 17 cm

= 54 cm.....01 mark

Perimeter of Δ PQR = perimeter of a square

Perimeter of square = 4s .....00½ mark

54 cm = 4s

$\frac{54\ cm}{4} = \frac{4S}{4}$

13.5 cm = S .....01 mark

Area = S^2 .....00½ mark

= 13.5 cm × 13.5 cm

= 182.25 cm^2.....01 mark