THE UNINTED REPUBLIC OF TANZANIA

NATIONAL EXAMINATIONS COUNCIL

FORM TWO NATIONAL ASSESSMET

0041 **BASIC MATHEMATICS**

Time: 2:30 Hours **ANSWERS** **Year: 2016.**

Instructions:

1. this paper consists of section A and B
2. Answer all questions
3. Each question carries Four marks.

1. (a) Calculate the sum of prime numbers between 70 and 90.
The prime numbers between 70 and 90 are: 71, 73, 79, 83, and 89.

Sum = 71 + 73 + 79 + 83 + 89 = 395

So, the sum of prime numbers between 70 and 90 is 395.

(b) If x = 6, y = -14, and z = -16, find the value of (x - z) / (y + z).
Substitute the given values into the expression:

(x - z) / (y + z) = (6 - (-16)) / (-14 + (-16)) = (6 + 16) / (-14 - 16) = 22 / -30 = -11 / 15

So, the value is -11/15.

2. (a) Lightness, Nancy, and Zawadi shared some money. Zawadi got 1/3 of the money. Nancy got 7/12 of the remaining money. What fraction of the money did Lightness get?
Let the total money be M.
Zawadi got 1/3M.
Remaining money = M - 1/3M = 2/3M.
Nancy got 7/12 of the remaining money:
Nancy got (7/12) × (2/3)M = 14/36M = 7/18M.

Money left after Nancy and Zawadi:
2/3M - 7/18M = 12/18M - 7/18M = 5/18M.
So, Lightness got 5/18 of the money.
(b) In a class of 40 students, 5 of them are absent. What percent is present?
Number of students present = 40 - 5 = 35.

Percentage present = (35 / 40) × 100 = 87.5%.
So, the percentage present is 87.5%.

3. (a) A container holds 20 litres of milk. If 150 bottles of milk are needed to fill the container, how many millilitres of milk does each bottle hold? (Use 1 litre = 1000 millilitres)
Total milk in millilitres = 20 litres × 1000 millilitres/litre = 20000 millilitres.

Milk per bottle = 20000 millilitres / 150 bottles = 20000 / 150 = 2000 / 15 = 400 / 3 ≈ 133.33 millilitres.
So, each bottle holds approximately 133.33 millilitres.

(b) Calculate the following:
(i) (70kg - 49kg) - (130g - 95g)
First, convert grams to kilograms:
130g = 0.130kg
95g = 0.095kg

Now, perform the calculation:
(70 - 49) - (0.130 - 0.095) = 21 - 0.035 = 20.965
So, the answer is 20.965kg.
(ii) (6km 4m) - (40m 11m)
First, we need to make sure the units are consistent. We'll convert everything to meters:
6km = 6 x 1000m = 6000m
6km 4m = 6000m + 4m = 6004m
40m 11m = 40m + 11m = 51m
Now, we can perform the subtraction:
6004m - 51m = 5953m

4. (a) Calculate the size of the angles marked x in the following:
In the given triangle, the angles are 60°, 40°, and x . The sum of angles for a straight line is always 180°.
So, 40° + x = 180° - 60°
x = 120°

Therefore, each of the angles marked x is 120°.
(b) (i)Use the given figure to find the value of m and n
Finding m:
On a straight line, the angles add up to 180°. In the triangle on the left, all the three angles are the same, so the value is 60°
Then, m = 180° - 60° = 120°
also, the remaining angles are the same, n
then, 2n = 180° - 120°
n = 30°, m = 120°
(ii) Determine the number of triangles
There are 3 triangles.

5. (a) Solve for x in the inequality $3x - 4 \geq 2x + 16$.
Solution:
$3x - 4 \geq 2x + 16$
Subtract 2x from both sides:
$x - 4 \geq 16$
Add 4 to both sides:
$x \geq 20$

So, the solution is $x \geq 20$.

(b) Solve the following pairs of simultaneous equations by the elimination method.
$2x + y = 10$
$3x - 2y = 1$
Solution:
Step 1: Multiply the first equation by 2 to align y:

$4x + 2y = 20$
$3x - 2y = 1$

Step 2: Add both equations:
$(4x + 2y) + (3x - 2y) = 20 + 1$
$7x = 21$
$x = 3$

Step 3: Substitute $x = 3$ into the first equation:
$2(3) + y = 10$
$6 + y = 10$
$y = 4$
So, the solution is $x = 3$, $y = 4$.

6. In a class of 40 students, 24 students study Geography and 21 students study History. Use Venn diagrams to find the number of students who study both Geography and History.

Solution:
Let G be the set of students studying Geography, and H be the set of students studying History. Let x be the number of students who study both subjects.

Using the formula for union of two sets:
$n(G \cup H) = n(G) + n(H) - n(G \cap H)$

Substituting the given values:
$40 = 24 + 21 - x$
$40 = 45 - x$
$x = 5$
So, the number of students who study both Geography and History is 5.

7. The angle of elevation of the top of the tower from my point on the ground 75 m from the foot of the tower is 25°. Find the height of the tower to the nearest metre.

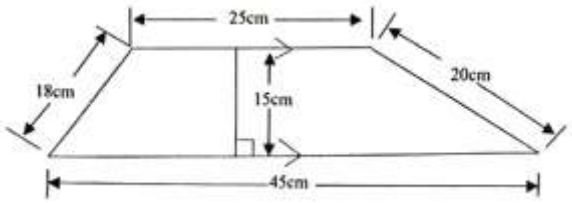
Solution:
Let h be the height of the tower. The situation forms a right-angled triangle where:
- The base (adjacent side) is 75 m.
- The height (opposite side) is h.
- The angle of elevation is 25°.

Using the tangent function:
$\tan(25°) = h / 75$
$h = 75 \times \tan(25°)$

Using a calculator:
$h \approx 75 \times 0.4663$
$h \approx 34.97$
To the nearest metre, $h \approx 35$ m.

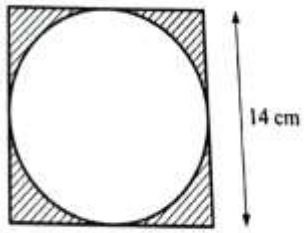
So, the height of the tower is 35 metres.

8. (a) Calculate the area and perimeter of the following trapezium.
Solution.



- area of a trapezium is given by:-
$A = \frac{1}{2}h(a+b)$
$= \frac{1}{2} \times 15 \times (45 + 25)$
Area = 525 cm²
- perimeter = 18 + 25 + 20 + 45 + 15 = 123 cm.

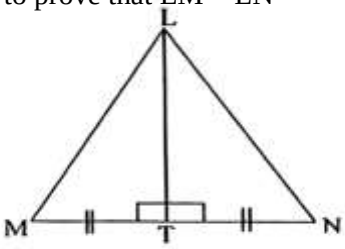
(b) Calculate the area of the shaded the region. (Use $\pi = 22/7$)
Solution:



- area of the square = 14 x 14 = 196 cm²
- area of the circle = $\pi \times 7^2 = 22/7 \times 7^2 = 154$ cm²

Area if the shaded region = 196 - 154
= 42 cm²

9. (a) Give an angle LMT = angle LNT use the following figure to prove that LM = LN



Solution.
Consider triangles ΔLMT and ΔLNT:
We are given that ∠LMT = ∠LNT.
We know that MT = NT (given).
LT = LT (common side).
- Apply the Side-Angle-Side (SAS) Congruence Postulate:
- If two sides and the included angle (the angle between those two sides) of one triangle are congruent to the corresponding two sides and included angle of another triangle, then the two triangles are congruent.
In our case:
LM and MT of ΔLMT correspond to LN and NT of ΔLNT
The included angles are ∠LMT and ∠LNT, which are equal.
Conclusion:
Since ΔLMT ≅ ΔLNT (Triangle LMT is congruent to Triangle LNT) by SAS, then their corresponding sides are congruent.
Therefore, LM = LN.

(b) If (ΔABC ~ ΔPQR) and (AC = 20 cm, RP = 10 cm, RQ = 12 cm) and (PQ = 9 cm), find the length of (AB) and (BC).
Solution:
Given that triangles ABC and PQR are similar (ΔABC ~ ΔPQR), the corresponding sides of the triangles are proportional.

The sides of the triangles can be represented as follows:
- AB corresponds to PQ
- BC corresponds to QR
- AC corresponds to PR

We are given the following lengths:
- AC = 20 cm
- RP = 10 cm (this corresponds to AC)
- RQ = 12 cm (this corresponds to BC)
- PQ = 9 cm (this corresponds to AB)

Step 1: Find the length of AB
Since triangles ABC and PQR are similar, we can use the following proportion:
AB / PQ = AC / PR
Let AB be x.
x / 9 = 20 / 10
Now solve for x:
x = (20 / 10) × 9 = 2 × 9 = 18 cm
Thus, the length of AB is 18 cm.

Step 2: Find the length of BC
Similarly, for the sides BC and QR, we can use the proportion:
BC / QR = AC / PR
Let BC be y.
y / 12 = 20 / 10
Now solve for y:
y = (20 / 10) × 12 = 2 × 12 = 24 cmThus, the length of BC is 24 cm.

10. The following table shows marks for a Form Two History monthly test:

Marks in %	25	35	40	50	60	65	70	75	80
Number of students	2	3	5	7	11	7	4	2	1

(a) What is the lowest mark?
The lowest mark is 25%.

(b) What is the highest mark?
The highest mark is 80%.

(c) Which mark is scored by the greatest number of students?
The mark scored by the greatest number of students is 60%, with 11 students.

(d) If 60% is the pass mark in the test, how many students failed?
Students who scored below 60% failed. We sum the number of students who scored below 60%:
- 25%: 2 students
- 35%: 3 students
- 40%: 5 students
- 50%: 7 students

Total students who failed = 2 + 3 + 5 + 7 = 17 students.
(e) How many students are in the Form Two class?
To find the total number of students, we sum the number of students in each category:
2 + 3 + 5 + 7 + 11 + 7 + 4 + 2 + 1 = 42 students.