THE UNINTED REPUBLIC OF TANZANIA

NATIONAL EXAMINATIONS COUNCIL

FORM TWO NATIONAL ASSESSMET

0041   **BASIC MATHEMATICS**

Time: 2:30 Hours   **ANSWERS**   **Year: 2014.**

Instructions:

1. this paper consists of section A and B

2. Answer all questions

3. Each question carries Four marks.

1. Calculate the value of x k + 2 + 02 + y, when x = 8, k = 1 − 2 and y = 9.
   Solution:
   x = 8, k = 1 − 2 = -1, y = 9.
   The expression is:
   x x k + 2 + 0^2 + y = 8 x (-1) + 2 + 0 + 9 = -8 + 2 + 9 = 3.
   Final answer: 3.

2. The radius of the earth is about 70,006,300 meters. Express the radius in scientific notation.
   Solution:
   The number is 70,006,300.
   To convert to scientific notation, we move the decimal point 7 places left:
   70,006,300 = 7.000063×10^7 meters.
   Final answer: 7.000063×10^7 meters.

3. If A and B are complementary angles such that A = 25° and B = x + 25°, find the value of x.
   Solution:
   Complementary angles add up to 90°.
   A + B = 90°.
   25° + (x + 25°) = 90°.
   x + 50° = 90°.
   x = 90° - 50° = 40°.
   Final answer: x = 40°.

4. Find the value of x in the equation 0.8/x = 0.03.
   Solution:
   0.8/x = 0.03
   x = 0.8 / 0.03 = 26.67.
   Final answer: x = 26.67.

5. Simplify the expression 7 + (3mn)(+4 − 3 − mn)m.
   Solution:
   7 + (3mn)(+4 − 3 − mn)m
   = 7 + (3mn)(1 - mn)m
   = 7 + 3mn(1 - mn)m
   = 7 + 3mnm - $3mn^2$m.
   Final answer: 7 + 3mnm - $3mn^2$m.

6. When 9 is added to 3 times a certain number, the result is greater than 90. Write down an inequality that represents the possible values of this number.
   Solution:
   Let the number be x.
   3x + 9 > 90
   3x > 81

x > 27.
Final answer: x > 27.

7. Without using mathematical tables, evaluate: $(1.295) - (1.297) / 2^2$.
   Solution:
   $(1.295 - 1.297) / 2^2$
   $= (-0.002) / 4$
   $= -0.0005$.
   Final answer: -0.0005.

8. The length of one side of a square is $(8x0) + 1$ cm. If the side lengths of the square are reduced by half, find the equation for the perimeter of the square after changing the length.
   Solution:
   Length of one side $= (8x0) + 1 = 1$ cm.
   Reduced length $= 1/2 = 0.5$ cm.
   Perimeter of the square $= 4 \times$ side length $= 4 \times 0.5 = 2$ cm.
   Final answer: Perimeter $= 2$ cm.

9. Find the value m + n, given that 7 * 75.
   $m \times 5n = 8$.
   Solution:
   7 * 75 = 525.
   $m \times 5n = 8$.
   525 = 8.
   The equation doesn't make sense as written; please check the numbers provided.

10. Jane requires a piece of cloth of 1.8 meters long to make her dress; whereas Mary requires a piece of cloth which is one and a half times as long as Jane's. How long is Mary's piece of cloth?
    Solution:
    Mary's cloth length $= 1.5 \times 1.8 = 2.7$ meters.
    Final answer: 2.7 meters.

11. Represent the solution set of the inequality x + 5 < 2 on a number line.
    Solution:
    x + 5 < 2
    x < -3.
    The solution set is all values less than -3.
    Final answer: x < -3.

12. In a form two class, 5% of the students can play football, 1/4 can play volleyball, 0.1 can play basketball, and 3/5 can play tennis. Arrange these numbers in descending order.
    Solution:
    Convert to decimals:

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5% = 0.05,
1/4 = 0.25,
0.1 = 0.1,
3/5 = 0.6.
Descending order: 0.6, 0.25, 0.1, 0.05.
Final answer: 3/5, 1/4, 0.1, 5%.

13. Write 375 grams as a fraction of 3 kilograms.
   Solution:
   3 kilograms = 3000 grams.
   375 grams / 3000 grams = 375/3000 = 1/8.
   Final answer: 1/8.

14. At Kilamara secondary school, the distance d1 from the dormitories to the classrooms is twice the distance d2 from the classroom to the playing grounds, whereas the distance d3 from the dormitories to the playing grounds is three times the distance from the dormitories to the classrooms. Using the given notations, write down the two equations that summarize this information and hence find the equation that connects d3 and d2.
   Solution:
   d1 = 2d2,
   d3 = 3d1.
   Substituting d1 = 2d2 into d3 = 3d1 gives:
   d3 = 3(2d2) = 6d2.
   Final answer: d3 = 6d2.

15. Determine the value of x that satisfies the equation $(x-4)/(x+10) = 3$.
   Solution:
   $(x - 4) / (x + 10) = 3$.
   Cross-multiply:
   $x - 4 = 3(x + 10)$.
   $x - 4 = 3x + 30$.
   $-4 - 30 = 3x - x$.
   $-34 = 2x$.
   $x = -34 / 2 = -17$.
   Final answer: $x = -17$.

16. Write $4\log 3 - \frac{1}{2}\log 81$ as a single logarithmic expression.
   Solution:
   $4\log 3 - \frac{1}{2}\log 81 = \log(3^4) - \log(81^{1/2})$.
   $= \log(81) - \log(9)$.
   $= \log(81/9)$.
   $= \log(9)$.
   Final answer: $\log 9$.

17. Find the product of the G.C.F and L.C.M of 6, 9, and 15.
   Solution:
   The G.C.F of 6, 9, and 15 is 3.
   The L.C.M of 6, 9, and 15 is 90.
   Product of G.C.F and L.C.M = $3 \times 90 = 270$.
   Final answer: 270.

18. Find the gradient of the straight line passing through the points $(-5, 2)$ and $(6, 2)$.
   Solution:
   Gradient (m) = $(y_2 - y_1) / (x_2 - x_1)$.
   $m = (2 - 2) / (6 - (-5)) = 0 / 11 = 0$.
   Final answer: 0.

19. If a triangle has two equal sides of length x cm each and the length of the remaining side is one-quarter of the total length of the two congruent sides, write down an equation that represents the perimeter of this triangle.
   Solution:
   The perimeter (P) is the sum of the three sides:
   $P = x + x + (x + x)/4$.
   Simplifying:
   $P = 2x + x/2$.
   Final answer: $P = 2x + x/2$.

20. Merina bought a bicycle for 75,000/= and sold it after two years at a loss of 25 percent. Calculate the amount of the loss.
   Solution:
   Loss = 25% of $75,000 = 0.25 \times 75,000 = 18,750$.
   Final answer: 18,750.

21. The area of a rectangular room is 196 cm². If its length is four times its width, find its perimeter.
   Solution:
   Let width = w, length = 4w.
   Area = length $\times$ width = 196.
   $4w \times w = 196$,
   $4w^2 = 196$,
   $w^2 = 49$,
   $w = 7$ cm.
   Length = $4 \times 7 = 28$ cm.
   Perimeter = $2 \times$ (length + width) = $2 \times (28 + 7) = 2 \times 35 = 70$ cm.
   Final answer: 70 cm.

22. Evaluate $\sqrt{0.3481} \times 2.78 \times 3.604$.

Solution:
√0.3481 = 0.590,
0.590 × 2.78 × 3.604 = 5.911.
Final answer: 5.911.

23. A ladder 12m long leans against the top of a vertical wall and makes an angle of 52 degrees with the wall. Find the height of the wall.
  Solution:
  Using trigonometry:
  $\sin(52°)$ = height / 12.
  height = $12 × \sin(52°) ≈ 12 × 0.788 = 9.46$ m.
  Final answer: 9.46 m.

24. In a class of 45 students, some study physics or chemistry or both. If 23 students study physics, 33 study chemistry, and 10 students do not study neither physics nor chemistry, find the number of students who study both physics and chemistry using the formula.
  Solution:
  Total students = 45.
  Students who study physics or chemistry or both = 45 - 10 = 35.
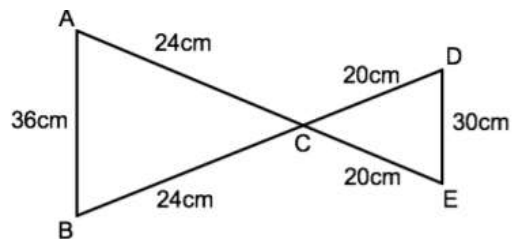 Using the formula for the union of two sets:
  $|P ∪ C| = |P| + |C| − |P ∩ C|$,
  $35 = 23 + 33 − |P ∩ C|$.
  $|P ∩ C| = 23 + 33 − 35 = 21$.
  Final answer: 21 students study both physics and chemistry.

25. In the figure below AB = 36cm, AC = BC = 24cm, EC = DC = 20cm and ED = 30cm. Show that triangles ABC and EDC are similar.

Solution:
AB/DE = 36/30 = 6/5………………….. (i)
AC/BC = DC/EC = 1…………………..(ii)
Angle ACB = angle DCB…….. vertical oppsite angle

Hence

Triangles ABC and EDC are similar…………………………….. *(SSA)*