S4 MATHEMATICS REVISION QUESTIONS
TIME: 2 HOURS 10 MINUTES

Instructions:

- Answer all questions in section A and not more than four from section B.
- Show your calculations clearly
- Maths tables, graph papers and calculators may be used.

SECTION A: (40 MARKS)

1. Simplify

$$\frac{4^x \times 64^{x-1}}{128^{x-1}}$$

2. Without using tables or calculators, find the value of $7.839^2 - 2.161^2$

3. Solve the equation $3x^2 - 7x + 2 = 0$

4. Given that $f(x) = \frac{1}{10 - 0.5x}$

   find
   (i) f (2)
   (ii) the value of x for which f(x) is not defined.

5. Solve the equation $(6 \times 0.5)^{x^2} = 3^{6-x}$

6. Given than $\frac{6}{3\sqrt{2} - 2\sqrt{3}} + = a\sqrt{2} + b\sqrt{3}$

7. Given that tan x = ¾ and $180^o < x < 360^o$ without tables or calculators, find the value of cosx + sinx.

8. If $\mathbf{a} = \begin{pmatrix} 3 \\ -2 \end{pmatrix}$ and $\mathbf{b} \begin{pmatrix} 1.5 \\ 3 \end{pmatrix}$, find the length of

   ½ **a** + 3 **b**

9. P and Q are two sets of objects such that n (Σ) = 12,

   n (PnQ) = 5, n (Q) = 8 and n (P U Q)' = 3

   Find
   (a) n(P U Q)
   (b) n(P)

10. given that log a = 0.234 and log b = 1.185 without tables or calculators, evaluate $\log a^5 b^2$

SECTION B (60 MARKS)

11. The marks of students were recorded as below:

72	70	66	74	81	70	74	53	57	62
58	92	74	67	62	91	73	68	65	80
78	67	75	80	84	61	72	72	69	70
76	74	65	84	79	80	76	72	68	63
82	79	71	86	77	69	72	56	70	67
76	56	86	63	73	70	75	73	89	64

(a) Starting with 50 – 54 make a frequency table of equal class width.
(b) Draw a histogram for the data
(c) Calculate the mean and median mark.

12. There are 120 students in the S4 class of Ngora High school. They must all take at least one subject from Physics, Biology or Chemistry, six students take only Physics, 20 take only biology, 45 take only chemistry, 16 take only biology and chemistry, 10 take only physics and chemistry and 12 take only physics and biology.
    (a) Represent the information above on a venn diagram
        Find
        (i) the number of students who take all the three subjects
        (ii) the number of students who take at least two subjects.
        (iii) The probability that a student picked at random takes only one subject.

13. Given the curve $y = x^2 + x - 6$
    (a) copy and complete the table below in the range $-5 < x < 5$

X	– 5	–4	–3	–2	–1	0	1	2	3	4	5
X^2	25										25
– 6	–6	–6	–6	–6	–6	–6	–6	–6	–6	–6	–6
$y = x^2 + x - 6$	14					–6					24

    (b) Use your table to draw the curve $y = x^2 + x - 6$
    (c) Use your graph to solve the equation
        (i) $x^2 + x - 6 = 0$
        (ii) $x^2 + x - 6 = 6$

14. Using a ruler and pair of compasses only
    (a) construct a triangle PQR in which $\overline{PQ}$ = 5.6 cm, $\overline{QR}$ = 7cm and $\angle PQR = 75^o$
    (b) circumscribe the triangle PQR
    (c) find the radius of the circle
    (d) calculate the circumference of the circle (use R = 3.142)

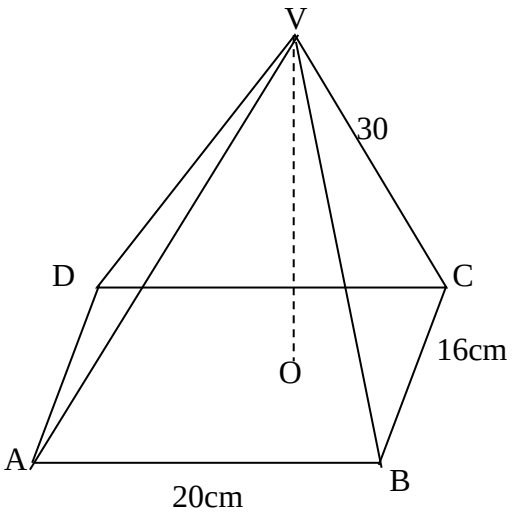
15. The points P(1,2), Q(3,2), R(3,5) are vertices of a triangle PQR. The images of P,Q and R under a reflection in the line x + y = O and P', Q' and R' respectively. The points P', Q' and R' are then mapped onto the points P", Q" and R" respectively, under an enlargement with scale factor –2 and centre of enlargement 0(0,0).

(a) Write down the matrix for the
   (i) reflection
   (ii) enlargement

(b) Determine the co-ordinates of the points
   (i) P', Q' and R'
   (ii) P", Q" and R"

(c) Find the matrix of single transformation which would map triangle PQR onto P" Q" R"

16.



The figure above shows a right pyramid ABCDV. O is the centre VC = VB = VA = VD = 30cm

Find:
(i) length AO
(ii) angle which VB makes with the base
(iii) the volume of the pyramid.

17. (a) Anselm deposited shs 2.4 million on his savings account at the bank at a compound interest rate of 8% per annum. Determine the number of years his money will take to accumulate to shs 2.9 million.

(b) A married man with two children has earned income of shs 857,500 per month. He has a personal allowance of shs 58,000 and an extra allowance for his children of shs 25,600 per child. Income tax is charged at 25% on the first shs 265,000, and 35% on the remaining income.
   (i) Find his taxable income if he has two children.
   (ii) How much income tax does he have to pay?
   (iii) On this tax rate find the taxable income of a person who pays tax of U. shs 70,000=