UNEB U.C.E MATHEMATICS (PAPER 1) 2008

SECTION A

1. Find the lowest common multiple (**LCM**) and the highest common factor (**HCF**) of 54 and 84.

2. The pie chart below represents yields of beans from three fields **A, B** and **C**.

PIE

If the total yield of beans was 300 sacks, calculate the number of sacks got from field **C.**

3. Express $2\log_3 18 + \log_3 3^{-1} - \log_3 6^2 + 1$ as a single logarithm $\log_3$ **Q.**

4. Given that **P** = $\begin{pmatrix} 3 & 1 \\ -1 & 3 \end{pmatrix}$, find a matrix P^{-1} such that PP-1 = I where I is the identity matrix of order 2.

5. Study the graph below:

GRAPH

Find the inequality representing the shaded region.

6. Evaluate: $\left(\frac{16}{81}\right)^{-3/4}$

7. Solve for w: $\frac{1}{5}(w+6) - \frac{1}{15}(2w-5) = \frac{1}{3}(1-w)$

8. Given that f(x) = 2x - 5, find:

a) F(-2)

b) $F^{-1}(x)$

9. In triangle **BCD, AD** = 15cm, **BD** = 25cm, **AB** = **AC** and **AB** is perpendicular to **CD**.

TRIANGLE

Find the length of **CB** correct to one decimal place.

10. In the diagram below, **O** is the centre of the circle and angle **BOD** = 164^0

CIRCLE

Find:

a) Angle **BAD**,

b) Angle **BCD**.

SECTION B

Answer any five questions from this section. All questions carry equal marks.

11. a) The points (-1, 9) and (r, 2) lie on the line y = 2 - x. find the values of q and r.

b) In the figure below, **P** is 4 units from **O**. the equation of the line **MN** is 4y + x = 12.

FIGURE

Find the area of **OPMN.**

12. a) Adikini bought a television set for which the cash price was shs 599,000. She bought the television set on a hire purchase scheme and had to pay an extra shs71, 000. If she made eight equal monthly installments, how much did she pay per month?

b) Mukasa wants to buy a house which is priced at shs56, 000,000. A deposit of 25% of the value of the house is required. A bank will lend him the rest of the money at a compound interest of 15% per annum and payable after two years.

Calculate the:

(i) Deposit Mukasa must make.

(ii) Amount of money Mukasa will have to pay the bank after two years.

(iii) Total money which Mukasa will spend to buy the house.

13. A club held swimming tests in Crawl (**C**), Backstroke (**B**) and Diving (**D**) for 72 members. Those who passed crawl were 49, 30 passed backstroke and 30 passed diving. 5 passed crawl and backstroke but not diving, 4 passed backstroke and diving but not crawl. 6 passed crawl and diving but not backstroke. 14 passed all the three tests.

a) Draw a Venn diagram to represent the given information.

b) Use the Venn diagram to find the number of members who:

(i) Passed the crawl test only.

(ii) Did not pass any test.

c) If a member is picked at random, what is the probability that the member passed two tests only?

14. Given that the point **A** has co-ordinates (-8, 6), vector **AB** = $\begin{pmatrix} 12 \\ 4 \end{pmatrix}$ and **M** is the mid point of **AB**;

a) Find the:

(i) Column vector AM.

(ii) Co-ordinates of **M**.

(iii) Magnitude of **OM**.

b) (i) Draw the vector **AB** on a graph paper.

(ii) From your graph, state the co-ordinates of **B**.

15. a) A unit square whose vertices are **O**(0, 0), **I** (1, 0), **j**(0, 1) and **k**(1, 1) is transformed by rotating through a positive quarter turn about the origin. Find the matrix for this transformation.

b) Give **T** = $\begin{pmatrix} 0 & -1 \\ 1 & 0 \end{pmatrix}$ and **M** = $\begin{pmatrix} -1 & 0 \\ 0 & -1 \end{pmatrix}$, find the:

(i) Image of the points **A** (0, 3) and **B** (5, 3) under the transformation **TM**.

(ii) Matrix of transformation which will map the images of A and B back to their original positions.

16. a) copy and complete the table below for the equation $y = 2x^2 - 3x - 7$,

x	$-1\frac{1}{2}$	-1	$-\frac{1}{2}$	0	$\frac{1}{2}$	1	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3

$2x^2$		2		0						
-3x		3		0						
-7		-7		-7						
y		-2		-7						

b)plot the points (**x, y**) obtained from the completed table on a graph paper using 2 cm to represent 1 unit on the **x** - axis and 1 cm to represent 1 unit on the **y** - axis.

Hence draw a graph for $y = 2x^2 - 3x - 7$.

c) Use your graph to solve the equation: $2x^2 - 3x - 8 = 0$.

17. a) The dimensions of a rectangle are 60 cm by 45 cm. if the length and width are each reduced by 10%, calculate the percentage decrease in area.

b) A container has a volume of 6400 cm^3 and a surface area of 8000 cm^2. Find the surface area of a similar container which has a volume of 2700cm^3.