UGANDA CERTIFICATE OF EDUCATION

MATHEMATICS PAPER I

TIME: 2 ½ HOURS

INSTRUCTIONS

- Attempt all numbers from section A and only 5 numbers from section B
- Show all the necessary working on the papers provided
- Silent non-programable calculators may used.

SECTION A

1. Express x^2+x-90 in the form of $(x+a)^2+b$. hence solve the equation $x^2+x-90=0$
2. If $A=\frac{2\pi}{K}\sqrt{(h+b)}$ make h the subject of the formula
3. A small farm has 20 animals, some are cows and others are goats. The numbers of goats are three times the number of cows. How many cows and goats does this farm has?
4. Given that $m*n=\frac{\sqrt{(m^2+n^2)}}{m+n}$ find 8 * -6
5. Under an enlargement of scale factor 3 the image of A (-1, 2) is A^1(-15, -4). Find the centre of enlargement.
6. Factorize completely $12x^2-3$
7. Solve the inequality $2x(x-4)\leq 2(x^2+x+6)$
8. By the help of an equilateral triangle of sides x units show that $\text{Sin}60^0=\frac{\sqrt{3}}{2}$
9. Given that A $\begin{pmatrix}1 & 2 & 3\\ 0 & 1 & 4\end{pmatrix}$ and B $\begin{pmatrix}-1 & 3\\ 2 & 0\\ -2 & -3\end{pmatrix}$
   Find the determinant of AB
10. If Y varies as a cube of x and $y=27$ when $x={}^3/_2$ find y when $x=2$.

SECTION B

11. The table below shows the marks got by S.4 students of a certain school.

Marks	10-19	20-29	30-39	40-49	50-59	60-69	70-79
No. of students	5	2	16	22	18	7	10

Use it to:

(i) Calculate mean mark using the working mean of 54.5

(ii) Draw a histogram and use it to estimate the model mark

12. (a) By matrix method solve $X + 2y = 1$

$3x + 4y = 9$

(b) Triangle PQR has vertices P(2, 3) Q = (-1, 5) and R (-4, -6). Find its image after a reflection along the line $x + y = 0$

13. (a) Using a ruler and pair of compasses only construct triangle ABC with angle BAC = 60^0 angle ACB – 90^0 and AC = 4cm.

(b) Taking C to be the centre of enlargement, enlarge triangle ABC to a scale factor of -2, to form triangle $A^1B^1C^1$.

(c) Find the area of triangle $A^1B^1C^1$.

(d) Circumscribe triangle $A^1B^1C^1$ and state its radius.

14. (a) On the same axes draw lines y = 10, X = 2 and $y + 2x = 8$

(b) Let line y = 10 meet $y + 2x = 8$ at p, y = 10 meet x = 2 at Q and X = 2 meet $y + 2x = 8$ at R

(c) Taking point R to be the centre of rotation rotate triangle PQR through 90^0 to give images $P^1Q^1R^1$. State the coordinates $P^1Q^1R^1$ hence the area of triangle $P^1Q^1R^1$.

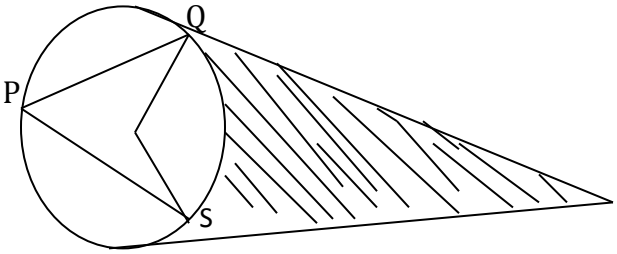
15. (a) Draw a graph of $y = -2x^2 + x - 10$ for $-3 \leq x \leq 3$.

(b) Use your graph to solve

(i) $-2x^2 + x + 10 = 0$

(ii) $-2x^2 + 3x + 9 = 0$

16.



In the figure above PQR is a circle of radius 5cm and centre O and $< QPS = 30^0$. Given that QR and SR are tangents to the circle, find the area of the shaded part.

17. (a) A ship started from port K to port L on the bearing of 160^0 for 300km, it then moved to port M for 400km on the bearing of 060^0. Use a scale of 50km represents 1cm, find the shortest distance between port K and M.

(b) If a plane is seen directly above port M from port K at an angle of elevation of 39^0. Find the height of the plane above M.

(c) Find the speed of a plane if it takes 2hours to fly direct from M to K **END**