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MATHEMATICS
Paper one
JAN./FEB.2021
2 ½ hours

KAMSSA JOINT MOCK EXAMINATIONS

Uganda Certificate of Education
MATHEMATICS

Paper one

2 ½ HOURS

INSTRUCTIONS

- *Answer all questions in section **A** and **any five** from section **B,***
- *Any additional questions answered will not be marked.*
- *All necessary calculations must be done on the same page as the rest of the answers.*
- *Only silent non – programmable scientific calculators may be used.*

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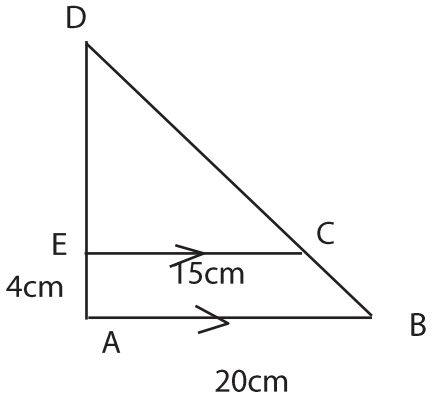
SECTION A(40MARKS)

1. Solve the inequality and write a solution set for $x - 2(x - 5) \leq x + 2$.

2. Given that ABCDE is a triangle with AB parallel to EC as shown below. With AB = 20cm, EC = 15cm and AE = 4cm. Find length AD.



3. If $M=\begin{bmatrix} 4 & 3 \\ -2 & 1 \end{bmatrix}$ and $N=\begin{bmatrix} 5 & 0 \\ 2 & 3 \end{bmatrix}$ find the determinant of 2m - 3N

4. Factorise the expression $10y^2 - 3y - 1$ hence solve $10y^2 - 3y - 1 = 0$

5. A coin is tossed with a die such that when a head appears it counts 4 and 9 for a tail. Find the probability that sum got when coin and a die are tossed once is a triangle number.

6. The matrix $\begin{bmatrix} x & 0 \\ 0 & 2x - 5 \end{bmatrix}$ enlarges A (3, -7) to A^1. Find the value of

(i) X

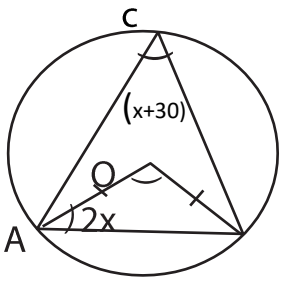
(ii) Cordinates of A^1.

7. Given that $5 \sin\Theta - 3 = 0$ without using calculator or tables find

(i) $\cos\Theta$ (ii) $\tan\Theta$.

8. If $n > a\sqrt{b - c}$ make C the subject.

9. Determine the value of x in



10. Given that $P \downarrow Q = \frac{2pQ}{p-Q}$ and

$x \downarrow 4 = 40$ find the value of x.

SECTION B (60 MARKS)

11. A triangle ABC with vertices A (2,0) B (4,0) and C (4,3) is given a positive quarter turn about the origin to produce A'B'C' followed by a reflection in the line $x + y = 0$ to produce A" B"C".

a) Write down the matrices for
   (i) positive quarter turn
   (ii) reflection in line $x + y = 0$

b) Find the coordinates of A'B'C' and A" B"C" using matrices in (a) above.

c) Find a single matrix of transformation which maps A" B"C" back onto ABC.

(12 marks)

12. Using a ruler, pencil and a pair of compasses only, construct a triangle PQR with base PQ = 8.2cm angle QPR $=60^0$ and PR = 7.5cm.

(i) Measure QR and angle PRQ.

(ii) Inscribe triangle PQR and measure the radius of this circle. ***(12 marks)***

13. Jovan and Jovia cycle to school which is 20km away. Jovia cycles 2km/hr faster than Jovan and reaches school half an hour earlier.

a) At what speed did Jovan and Jovia cycle?

b) How far can they cycle in 5 hours using their speeds in (a) above?

14 (a) Given that matrix AB $= \begin{bmatrix} -13 & 1 \\ 11 & 11 \end{bmatrix}$ Find matrix B such that $\begin{bmatrix} 4 & -1 \\ 2 & 3 \end{bmatrix}$ (7marks)

(b) Use Matrix method to solve

$2x - y = 8$

$4x - 3y - 14 = 0.$

(5 marks)

15. A transport company uses two types of trucks A and B. Type A carries 200 bags of cement while type B carries 300 bags of cement per trip. There are more than 12000 bags of cement to be moved, and the trucks are to no more than 60 trips. Type B trucks are to make at most twice the number of trips made by the type A trucks.

a) If x and y represent the number of trips made type A trucks and type B trucks respectively, write down five inequalities representing this information.

b) Plot these inequalities on the same graph paper shading out the unwanted region.

c) The transporter makes a profit of Shs. 300,000 per trip on truck A and Shs. 60,000 on type B truck. Write down an objective function for the profit. State the number of trips he should make in order to maximise his profit.

c) Plot these inequalities on the same graph paper shading out the unwanted region.

c) The transporter makes a profit of Shs. 300,000 per trip on truck A and Shs. 60,000 on type B truck.

Write down an objective function for the profit. State the number of trips he should make in order to maximise his profit.

16. The table below show marks obtained by 50 students in mathematics test.

12	18	24	29	37	45	47	38	31	44
19	13	14	20	25	32	39	40	33	25
21	14	40	33	26	21	15	16	22	27
34	41	41	35	27	22	16	17	27	22
42	35	18	22	28	36	43	18	23	36

a) Make a grouped frequency table for the marks starting with 12-19. Use your table to state

(i) Modal frequency

(ii) Class size

b) Calculate the mean mark

c) Plot an ogive and use it to estimate the median mark. ***(12 marks)***

17. Copy and complete the table below.

x	-40	-3.5	-3.0		-2.5	-2.0	-1.5	-1	-0.5	0	0.5	1
$2x^2$	32				12.5							2
5x-3	-23				-15.5							2
$y=2x^2+5x_{-3}$	9				-3							4
1	1	1	1		1	1	1	1	1	1	1	1
y= x+1	-3				-1.5							2

d) i) For coordinates for $y = 2x^2 + 5x_{-3}$ and $y = x + 1$.

ii) Plot these coordinates on the same axes.

e) Use your graph to solve $2x^2 + 5 + x-3 = x+1$. *(12 marks)*