

## UNEB U.C.E MATHEMATICS (PAPER 1) 2017

### SECTION A

Answer all questions in this section

1. Factorize  $:(x+4)^2 - (x-3)^2$

2. Solve the simultaneous equations

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

$$x + 4y + 2 = 0$$

3. The table below shows marks obtained by 34 students in a Chemistry test. Calculate the mean mark.

Marks	Number of Students
20-29	3
30-39	5
40-49	8
50-59	8
60-69	10

4. Given that  $s^*t = 2s^2 - 3t$ , evaluate  $6^*(5^*2)$

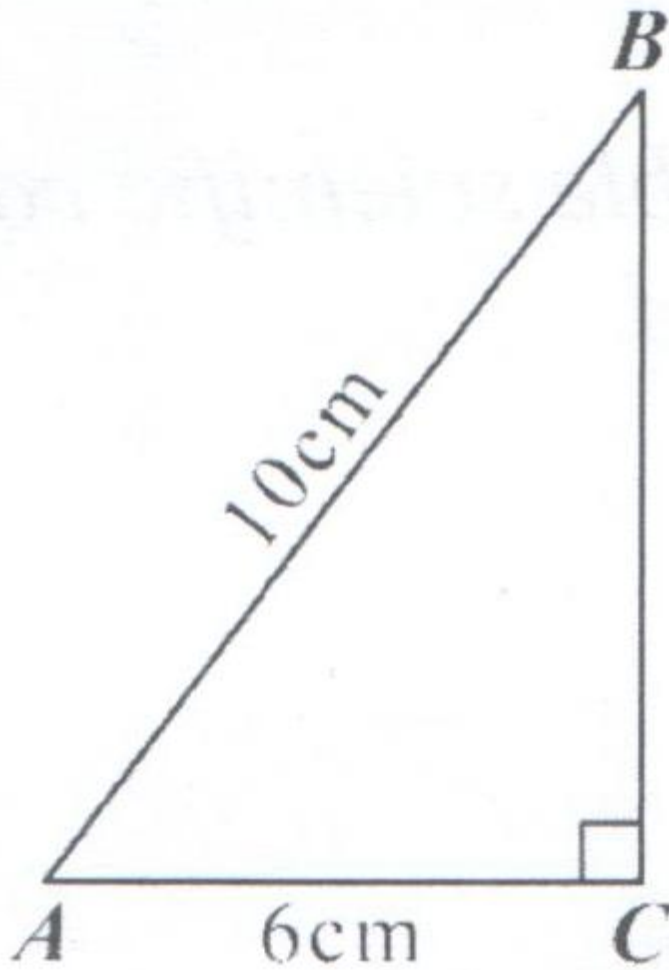
5. An interior angle of a regular polygon is  $162^\circ$ . Find the sum of its interior angles.

6. Find the values of  $x$  and  $y$  in  $3 \begin{pmatrix} x & 0 \\ 0 & y \end{pmatrix} - 2 \begin{pmatrix} x & 0 \\ 0 & y \end{pmatrix} = \begin{pmatrix} 3 & 0 \\ 0 & 4 \end{pmatrix}$

7. Solve for  $x$  in the inequality  $\frac{1}{2} - x < x - \frac{1}{4}$

8. In the right angled triangle ABC below,  $AB = 10\text{cm}$  and  $AC = 6\text{cm}$

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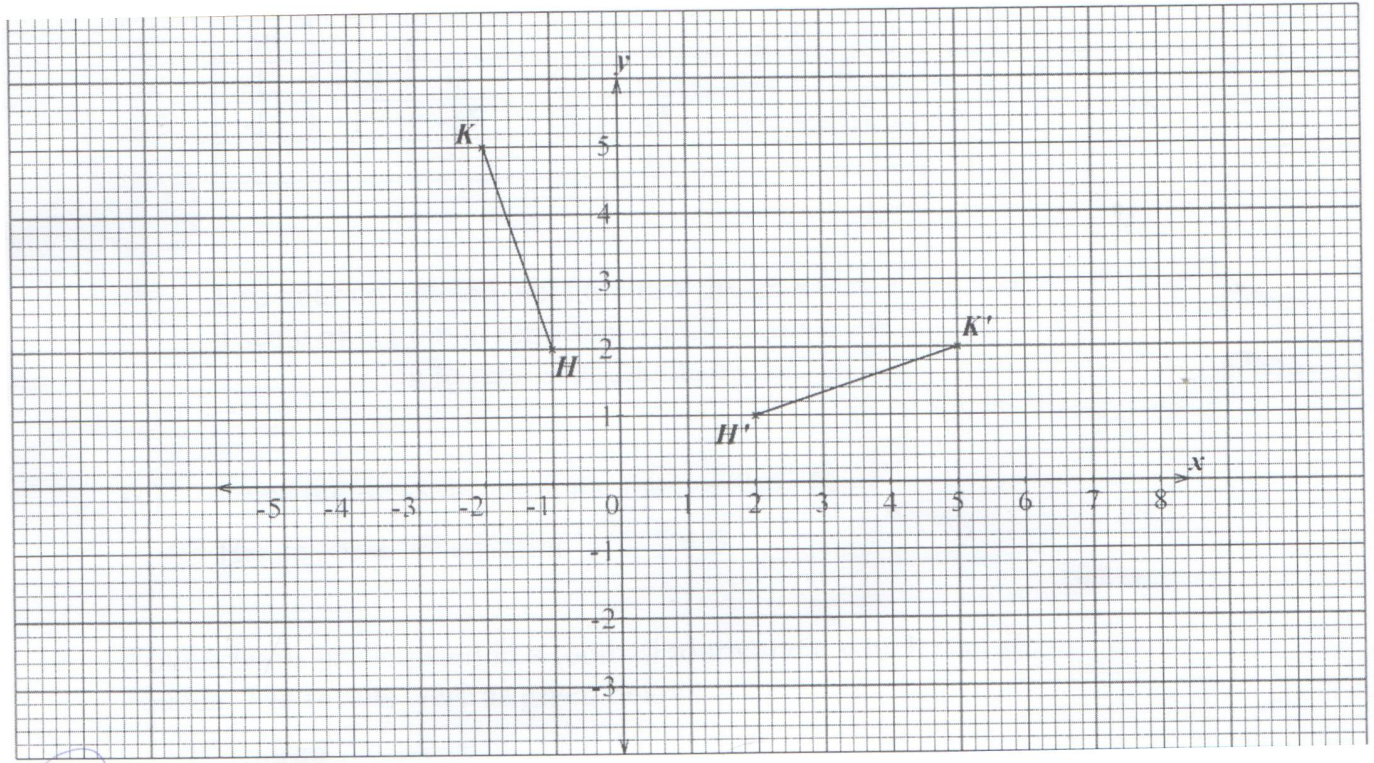
Determine the;

- a) Length of BC
- b) area of triangle ABC

9. A number which is divisible by 3 is chosen at random from a set of even numbers between 1 and 20. What is the probability of choosing the number?

10. The graph below shows the line HK and its image H# K### after a rotation in the clockwise direction.

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Use the graph to determine the;  
coordinates of the centre of rotation  
angle of rotation

### SECTION B

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

11. Copy and complete the table of values below for  $y = x^2 + 2x - 15$ .

$x$	-6	-5	-4	-3	-2	-1	0	1	2	3	4
$x^2$	36				4				4		
$2x$	-12	-10	-8	-6	-4	-2	0	2	4	6	8
$-15$	-15	-15	-15	-15	-15	-15	-15	-15	-15	-15	-15
$y$	9				-15				-7		

a) Use your completed table to draw the graph of  $y = x^2 + 2x - 15$ . Use a scale of: 1cm to represent 1 unit on the x-axis, 1cm to represent 2 units on the y- axis.

b) Draw on the same graph the line  $y = 2x - 14$   
Hence solve the equation  $x^2 - 1 = 10$ .

12. Four schools participated in a football tournament which was played in two rounds. The results were as given below;

#### 1st Round

- Bakulu S.S won one, drew three and lost two matches
- Dodo S.S won two, drew two and lost two matches.
- Kawunga S.S won three, drew two and lost four matches.

#### 2nd Round

- Bakulu S.S won one, drew two and lost three matches

- Dodo S,S won two, drew one and lost three matches
- Kawunga S,S won two, drew three and lost one match
- Oronga S,S won one, drew four and lost one match.

- Write down a  $4 \times 3$  matrix which shows the performance of the schools in
  - each of the two rounds
  - both rounds
- Three points are awarded for a win, one point for a draw and no point for a loss.
  - Write down a  $3 \times 1$  matrix to represent the award of points
  - Using matrix multiplication, determine which school won the tournament.

13.a) Make D the subject of the expression

$$L = \sqrt{\frac{3B}{T-D}}$$

Hence, find the value of D when  $B = 540$ ,  $L = 18$  and  $T = 17$

b) Auma bought 5 sackets of washing powder and a tube of toothpaste at shs1,700 in January. In February she bought 15 sackets of washing powder and 2 tubes of toothpaste at Shs4,400. What was the price of each item during the two months?

Using a ruler, a pencil and a pair of compasses only, construct a triangle  $ABC$ , where angle  $ABC = 75^\circ$ ,  $AB = 9.3\text{cm}$ ,  $BC = 8.7\text{cm}$

- Measure the length of  $AC$  and angle  $ACB$
- Draw an inscribed circle in the triangle  $ABC$ 
  - Find the radius of the circle

15. A cupboard has 5 white cups and 3 black cups. Two cups are picked from the cupboard one after the other without replacement.

- Draw a tree diagram to represent the given information
- Calculate the probability of picking :
  - one white cup and one black cup
  - two cups of the same color
  - at least one white cup

16. A triangle whose vertices are  $P, Q$  and  $R$  is mapped on a triangle whose

$(5, 7)$  and  $R' (0, 2)$  by a matrix of transformation  $\begin{pmatrix} 3 & -1 \\ 4 & -1 \end{pmatrix}$ . The triangle  $PQR$  is then mapped onto triangle  $P'Q'R'$  by a matrix of transformation  $\begin{pmatrix} 2 & 0 \\ 0 & 2 \end{pmatrix}$ .

vertices  $P, Q, R$  are

Find the;

- coordinates of  $P, Q$  and  $R$
- single matrix of transformation which would map  $P, Q, R$  back onto  $PQR$ .
- coordinates of  $P, Q$  and  $R$

17. An investor wants to buy 2 types of generators A and B. Generator A needs  $2\text{ m}^2$  of space and B needs  $3\text{ m}^2$ . The available space is only  $60\text{ m}^2$ . The cost of A is £2,000 and that of B is £10,000. The investor has £80,000 to be spent. If  $x$  and  $y$  represent number of generators of type A and B respectively,

- write down four inequalities from the information given

b) represent the four inequalities on the same axes.

c) find the greatest number of generators of both types A and B that the investor can buy using the minimum amount of money

**END**

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