456/1
Mathematics
Paper 1
June/July 2019
2 ½ hours

ACEITEKA MOCK EXAMINATIONS 2019

UGANDA CERTIFICATE OF EDUCATION

MATHEMATICS

PAPER 1

2 HOURS 30 MINUTES

INSTRUCTIONS TO CANDIDATES

Answer *ALL* questions in Section A and any five questions in section B.

All necessary calculations must be shown.

Silent, non-programmable calculators may be used.

SECTION A: (40 MARKS)

1. A bag contain x red balls and (x - 8) white balls. If the probability of drawing a red ball is $\frac{2}{3}$,find the number of balls in the bag. **(4 marks)**

2. Given that $ab = 27$ and $\log_a b = 2$ .Solve for the values of a and b. **(4 marks)**

3. Given that $5a = \dfrac{b - 2c}{bc}$, make c the subject for the formula. **(4 marks)**

4. Solve for in the equation : $\dfrac{x + 2}{3} - \dfrac{8 - x}{2} = \dfrac{x}{6}$.
   (4 marks)

5. Form a quadratic equation whose solution set is $\left\{\dfrac{3}{5}, -3\right\}$ **(4 marks)**

6. In the figure below, QS is a diameter of the circle with targets OQ and OR from point O, if angle QSR $= 34^{0}$, find;
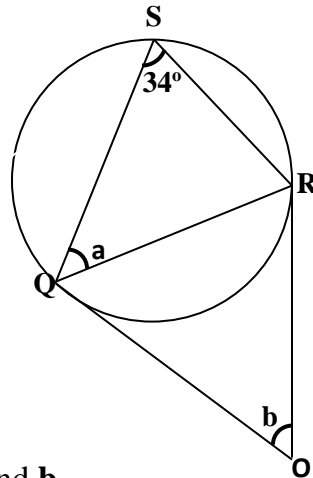
   the value of angles **a** and **b** **(4 marks)**

7. A poultry farm has only chicken and goats. When the manager counted the heads of the stock in the farm, the number totaled to 200. When the number of legs was counted, the number totaled to 540. How many chickens were there on the farm? **(4 marks)**

8. Find the inverse of the matrix $\begin{pmatrix} -1 & 2 \\ -4 & 3 \end{pmatrix}$ **(4 marks)**

9. The point R(-4, 1) is mapped onto $R'(5,4)$ after an enlargement centre M with scale factor -2. Using vectors, determine the coordinates of M. **(4 marks)**

10. Given that $17\sin\theta = 15$ for $180° \geq \theta \geq 90°$, without using tables or calculators find the value of $34\cos\theta - \tan\theta$ **(4 marks)**

SECTION B: (60 MARKS)

11. The cost of manufacturing Blue in a factory is determined by the components milk x and flavor y. If the constraints for the production are $3y + 2x \leq 15, 2x - 3y \leq 5, x \geq 1$ and $y \geq 0$.
    (a) Represent the constraints above on a squared paper
    (b) Given that the cost function $c = x + 2y$, find the;
       (i)   Minimum cost

(ii)   Maximum cost   **(12 marks)**

12. The table below shows the marks obtained in Mathematics Examination.

Marks, x	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69	70-74	75-79
Freq. f	1	2	4	5	6	9	5	1	5	2

(a) (i) Draw a histogram to represent the data.
    (ii) Estimate the mode from the histogram.   **(5 marks)**

(b) Using an Assumed mean of 52, calculate the mean mark   **(7 marks)**

13. ABC is a triangle whose vertices are A(2,2) B(6,4) and C(2,6). ABC is enlarged using a scale factor of -1.5 about the origin to form $A'B'C'$. $A'B'C'$ is then rotated through 90° about the origin to form $A''B''C''$.
    (a) Write down the matrices for enlargement and rotation   **(2 marks)**
    (b) Use your matrices above in (a) to determine the coordinates of $A'B'C'$ and $A''B''C''$
                                                                                                    (6 marks)

(c) Find a single matrix which maps $A''B''C''$ back onto ABC   **(4 marks)**

14. (a) Using matrix method solve the following simultaneous equation.
    $2x - y = -4$
    $5y + x = 9$

                                                                                                    (06 marks)

(b) Given that $(m \quad 1-m)\begin{pmatrix} 2 & 18 \\ 2 & 6 \end{pmatrix} = 4(1-m \quad n)$,, find the values of m and n.

                                                                                                    (6 marks)

(a) Given that $y = 2x + 2$ and $y = x^2 - 3x + 2$ for $-2 \le x \le 5$
(b) Draw the two graphs on the same axes
(c) Use your graph to find the roots of the equations.
    (i) $x^2 - 3x - 4 = 0$
    (ii) $x^2 - 5x = 0$ **(12 marks)**

15. (a) Two positive numbers differ by 4 and the sum of their squares is 136. Form an equation and solve it to find the numbers   **(6 marks)**

(b) A gardener makes a rectangular flower bed by taking two metres off its length and adding three metres to its breadth. By so doing, he increases the area by 20 square metres. What is its final area? **(6 marks)**

16. (a) Moses is 1.5m tall and standing on top of a building 34m tall. In a straight line from where he is standing he can see a car and bicycle at angles of depressions of 50º and 65º respectively. How far is the bicycle from the car? **(6 marks)**

(b) Given that a regular nonagon (9 – sided polygon is) is of side 10cm. Calculate the area of the nonagon. Express your answer to the nearest cm^2 **(6 marks)**

END