456/1

Mathematics

Paper 1

Jul. /Aug. 2019

2 ½ Hours

JOINT MOCK EXAMINATIONS, 2019

Uganda Certificate of Education

MATHEMATICS

Paper 1

2 Hours 30 minutes

INSTRUCTIONS TO CANDIDATES

- Answer **ALL** questions in section **A** and **NOT** more than five questions from section **B.**
- Any additional question(s) answered will not be marked
- All necessary calculations **MUST** be done on the answer booklet provided.

  Therefore, no paper should be given for rough work.
- Only silent non-programmable scientific calculators may be used.
- Mathematical tables, graph papers are provided.
- No paper should be given for rough work
- State the degree of accuracy at the end of each answer attempted using a calculator or tables; and indicate **Cal** for calculator, **Tab** for mathematical table

Turn Over

SECTION A: COMPULSORY (40 MARKS)

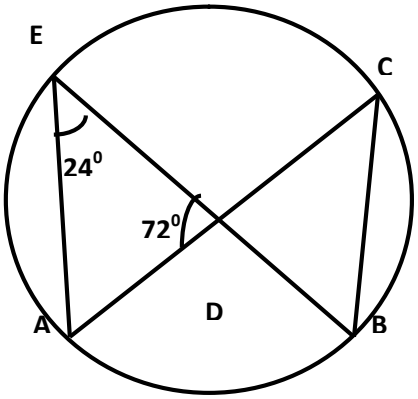
Attempt **all** questions in this section

1. If $y * x = 2(y + x) - xy$, find $(2 * 3) * -3$. **(04 Marks)**

2. Solve for x on the equation $9^{(x-3)} \times 81^{(1-x)} = \frac{1}{27}$. **(04 Marks)**

3. Simplify $\frac{2x^2-3xy-2y^2}{4x^2-y^2}$ **(04 Marks)**

4. In the figure , find the size of angles ACB and EBC



(04 Marks)

5. Given that the matrix $\begin{pmatrix} 2x-1 & 2 \\ 3 & x \end{pmatrix}$ is singular, find the value of x. **(04 Marks)**

6. Given $sinx$ = -0.56 an that $0^0 \leq x \leq 360^0$, find x. **(04 Marks)**

7. Solve for x and y given that $5^{x-2y} = 25$ and $3^{2x} \div 3^y = 3^4$. **(04 Marks)**

8. Make x the subject of the formula $t = \frac{2y+1}{\sqrt{2xy+x}}$. **(04 Marks)**

9. Triangle ABC has vertices A(1,4) B(3,4) C(3,1) . Find the coordinates of the image of ABC under a quarter turn of 90^0 about the origin. **(04 Marks)**

10. The probability that it will rain on a certain morning is $^2/_3$. If it rains, the probability that Martha misses her bus is $^3/_4$. If it does not rain, the probability that she catches the bus is $^5/_6$. Draw a tree diagram for this information and use it to find the probability that it rains and Martha catches the bus. **(04 Marks)**

SECTION B: (60 MARKS)

Attempt only 5 questions from this section

11. Draw a cumulative frequency curve for the following grouped frequency distribution of life span in a dynasty

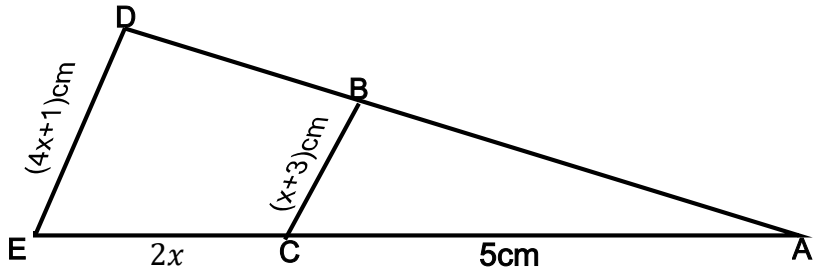
Class	20 – 29	30 – 39	40 – 49	50 – 59	60 – 69	70 – 79
Frequency	15	15	20	17	10	6

(a) Use your curve to estimate the median life span.

(b) Calculate the mean of the life span.

(12 marks)

12.



Triangles ABC and ADE are similar, with BC parallel to DE.

$\overline{AC} = 5cm \quad \overline{CE} = 2xcm \quad , \ \overline{BC} = (x+3)cm$ and $\overline{DE} = (4x+1)cm$

(a) Write an equation in x and show that $2x^2 - 9x + 10 = 0$

(b) Factorize $2x^2 - 9x + 10$

(c) Solve $2x^2 - 9x + 10 = 0$

(d) For the larger value of x, find the fraction $\frac{Area\ of\ \Delta\ ABC}{Ara\ of\ \Delta\ ADE}$ in the simplest form. **(12 marks)**

13. In this question using a ruler, a pencil and a pair of compasses only, construct

(a) A quadrilateral ABCD in which $\overline{AB} = \overline{AC} = \overline{AD}$= 6cm. angle CBA = 75^0 and angle DAB = 105^0

(b) Bisect angle ACB, let the bisector meet $\overline{AB}$ at E and $\overline{DA}$ produced at F. construct a circum-circle to triangle AEF

(c) Measure the distance from the centre of the circle O to the vertex B. What is the radius of the circle? **(12 marks)**

14. Wandera and Musoke take a driving test. The probability that Wandera will pass is $^5/_8$ and the probability that Musoke will pass is $^3/_5$.

(a) Calculate the probability that they will both fail.

(b) Calculate the probability that only one of them will pass

(c) If Musoke fails, he will take the test again. The probability that he will pass at any further attempt is $^5/_6$.

(d) Draw a tree diagram to show the probabilities of Musoke passing or failing on each of these three attempts.

(e) Calculate the probability that he will not need more than 3 attempts.

(12 marks)

15. Triangle ABC with vertices A(1,-1) B(1,-4) and C(3,-2) s mapped onto $A^1B^1C^1$ with vertices A'(1,1), B'(x,y), C'(3,4) by a transformation represented by matrix T= $\begin{pmatrix} a & b \\ c & d \end{pmatrix}$

(a) Find vales of a, b, c, d

(b) Find coordinates of point B^1.

(c) Triangle $A^2B^2C^2$ is the image of triangle $A^1B^1C^1$ under a rotation of 90^0 about the origin. Find the coordinates of $A^2B^2C^2$

(d) Determine the single matrix that maps ΔABC onto $A^2B^2C^2$

(e) What matrix maps Δ$A^2B^2C^2$ back to ABC? **(12 marks)**

16. An export company is to transport 300 tonnes of pineapples. Two cargo planes are available. A Boeing which can carry 30 tonnes of pineapples per flight and an Airbus which can carry 20 tonnes of pineapples per flight. The airbus has to make more, flights than the Boeing. The Boeing has to make at least 3 flights. The company has 150,000 US dollars for transport costs. The cost per flight is 12,000 dollars for Boeing and 9,000 dollars for Airbus.

If x is the number of flight made by the Boeing and y is the number of flight made by the Airbus.

(a) Write down four inequalities for the given conditions

(b) Plot graphs of the inequalities you have formed on the same axes and shade the unwanted regions.

(c) Find the number of flights each plane should make if the cost of transport is to be minimized. **(12 marks)**

17. Given $y= 3x^2 – 5x – 7$, copy and complete the table below an use it to answer the questions that follows

x	-3	-2	-1	0	1	2	3	4	5
y	35			-7					43

(a) Draw a graph of $y = 3x^2 – 5x – 7$

(b) Use your graph to solve $3x^2 -5x -7= 0$

(c) Use your graph to solve $3x^2 – 2x -12 =0$. **(12 marks)**

End