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MATHEMATICS

Paper 1

June 2017

2½ hours

RESOURCEFUL MOCK EXAMINATIONS, 2017

Uganda Certificate of Education

S.4

MATHEMATICS

Paper 1

2 hours 30 minutes

INSTRUCTIONS TO CANDIDATES

Answer **all** *questions in section* **A** *and any* **five** *in section* **B**.

Write in blue or black ink only. You may use pencil for diagrams or graphs only.

All *the necessary working must be clearly shown.*

Silent non-programmable scientific calculators may be used.

SECTION A (40 marks)

Attempt **all** *questions in this section*

1. Given that $a*b=\frac{\left(a^2-b^2\right)}{27}$, evaluate $14*13$. (04 marks)

2. Solve for x in the equation;
$$\frac{2x-5}{3}-\frac{3x-1}{4}=\frac{3}{2}$$ (04 marks)

3. Make t the subject in the formular.
$$P=\frac{n}{2m}\sqrt{\frac{F}{k-t}}.$$ (04 marks)

4. The cost of 3 shirts and a pair of trousers is shs. 22,000 and the cost of 2 shirts and 4 pairs of trousers is shs. 37,000. Find the cost of each item. (04 marks)

5. Given that $43_{nine}=124_n$, determine the value of the natural number n. (04 marks)

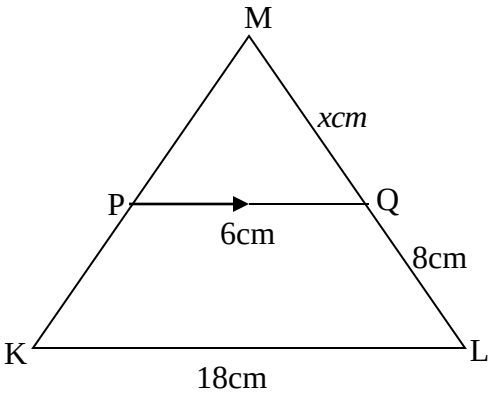
6. Express the recurring decimal 0.32525… as a rational number in its simplest form. (04 marks)

7. Factorise completely; $2xy^2-32x^3$. (04 marks)

8. Given that $12\tan\theta=5$, without using tables or a calculator, determine the value of $2\cos\theta-5\sin\theta$. (04 marks)

9. A three digit number is formed from the digits 5, 8 and 4 without repetition. Find the probability that the number formed is divisible by 4. (04 marks)

10.



In the figure, calculate the length of ML.

SECTION B: (60 marks**)**

11.a) Given that matrix $A=\begin{pmatrix}3 & 2\\ 4 & -7\end{pmatrix}$, find A^{-1}.

b.) Three ladies P, Q and R went to a certain market. P bought 2kgs of sugar, 1kg of tea leaves and 2 loaves of bread. Q bought 10kgs of sugar and 2 loaves of bread while R bought 5kgs of sugar, 2kgs of tea leaves and 1 loaf of bread. At that market sugar costs shs. 2300 per kg, tea leaves cost shs 1,800 per kg and a loaf of bread shs. 3500. Write down a;

(i) 3 x 3 matrix for the items
(ii) 3 x 1 matrix for prices
(iii) By using a suitable matrix multiplication, determine the total expenditure of the ladies.(12 marks)

12.a) On the same axes draw the graph of $y=x^2-2$ and $y=6-x^2$ for $-4\le x\le 4$.
(*Use a sale of 1cm: 1 unit on both axes*).

b.) Use your graphs to solve the equation, $x^2-4=0$. (12 marks)

13. The table below shows masses in kg and the corresponding cumulative frequency of the senior one students.

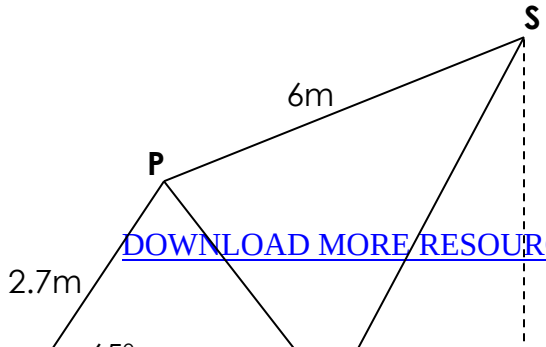
Mass (kg)	10-19	20-29	30-39	40-49	50-59	60-69
Cumulative frequency (c.f)	5	12	27	39	47	50

a.) State the;
(i) class width
(ii) model class

b.) Calculate the;
(i) mean mass using an assumed mean of 34.5kg
(ii) median mass (12 marks)

14. A helicopter flew from station **A** north wards to station **B** which is 300km away. From **B,** it changed its course and flew on a bearing of N45^{0}W or 315^0 to **C**. From **C**, it then flew to station **D** due East of **C**, 500km away. If the total distance traveled by the helicopter from **A** to **D** is 1050km,
(i) Draw an accurate diagram using a scale of 1cm to represent 50km.
(ii) What is the bearing of **D** from **A**?
(iii) Calculate the time taken if the helicopter flew directly from **A** to **D** at 125km/hr.
(12 marks)

15.



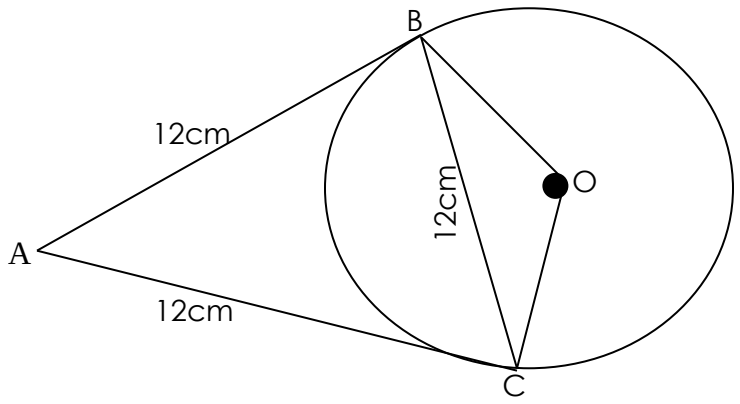
In the figure above, **QRT** is a horizontal ground, **PQ**=PR=2.7m, **PS**=**RS**=6m and angle **PQR**=65^0 . Calculate the;

a.) Length **QR**
b.) Angle **PRS**
c.) Angle **SRT**
d.) length **QT**
e.) length **ST** (12 marks)

16.a) By graphical method, find the point of intersection of the lines $y = 2x - 5$ and $y = -x - 5$. Calculate the area of the triangle enclosed between the lines and the x-axis. (06 marks)

b.) A parallelogram has its vertices a $A(2, \quad 1)$, $B(6, \quad 1)$, $C(x, \quad y)$ and $D(-1, \quad -4)$. Find the values of x and y. Hence find the coordinates of the midpoints of $\overline{BD}$ and $\overline{AC}$. (06 marks)

17. In the figure below, **AB** and **AC** are tangents to the circle at points **B** and **C** respectively. **O** is the centre of the circle.



Given that **AB** = **BC** = **AC** = 12cm, determine;

(i) the obtuse angle **BOC**
(ii) the radius of the circle
(iii) the area of the minor sector **BOC** and hence the area of the shaded region. (12 marks)

END