KENYA NATIONAL EXAMINATION COUNCIL
REVISION MOCK EXAMS 2016
TOP NATIONAL SCHOOLS

MANG'U HIGH SCHOOL

MATHEMATICS

PAPER 1

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MANG'U HIGH SCHOOL KCSE TRIAL AND PRACTICE EXAM 2016

121/1
MATHEMATICS
PAPER 1
TIME: 2 ½ HOURS

SECTION I:(50 MARKS)
***Answer ALL questions in this section*:**

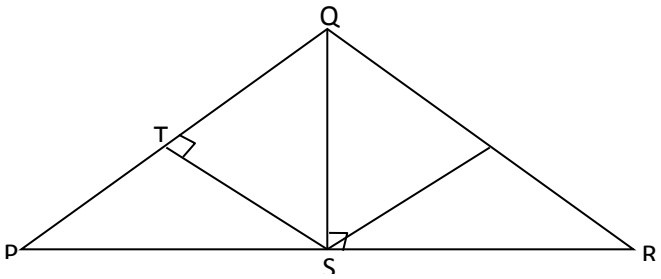
1. Evaluate: $\dfrac{-12 \div (-3) \times 4 - (-20)}{-6 \times 6 \div 3 + (-6)}$ (3 marks)

2. An airbus left Nairobi at 1945hrs and arrived in London at 0320hrs. It stayed for $1\frac{1}{2}$ hrs for rest and refreshment of passengers and crew. It then headed for Washington D.C and took $10\frac{1}{4}$ hrs.
   (a) How long did the journey from Nairobi to London take in hours and minutes? (2 marks)
   (b) At what time did it arrive in Washington D.C. (2 marks)

3. Evaluate: $\dfrac{\frac{3}{4} + 1\frac{5}{7} \div \frac{4}{7} \text{ of } 2\frac{1}{3}}{\left(\frac{3}{7} - \frac{5}{8}\right) \times \frac{2}{3}}$ (3 marks)

4. In the Kapsabet station church choir, the ratio of male to female is 2:3. On one Sunday service, 10 male members were absent and six new female members joined the choir as guests for that day. If on this day the ratio of males to females was 1:3, how many regular members does the choir have? (3 marks)

5. The figure **below** represents a roof truss symmetrical about QS. Beam PQ is 5m long and strut TS is 2.4m long. The distance TQ is 1.8m.



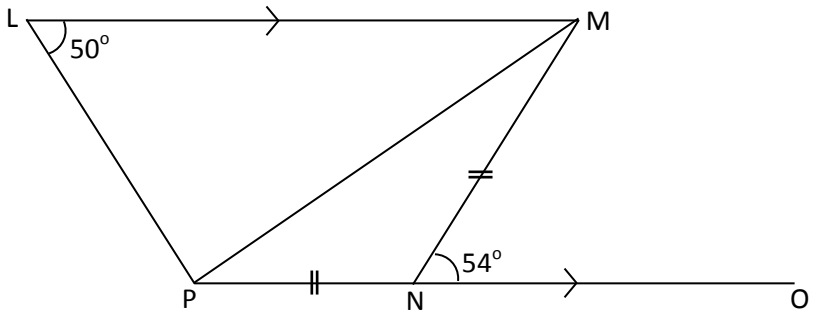
   Calculate:-
   (i) the height QS. (2 marks)
   (ii) hence, find the span PR of the roof. (2 marks)

6. An article was bought at Ksh.2250 then later sold for Ksh.2520. Calculate:-
   (i) the percentage profit. (2 marks)
   (ii) the price at which it should be sold to make a profit of 20%. (2 marks)

7. In a rectangle ABCD, the side AB has equation $3\chi + 2y = 6$ and vertex D has coordinates (-2, 4). Find the equation of side AD in the form $a\chi + by = C$. Where a, b and C are integers. (3 marks)

8. In the figure **below** $\angle MNO = 54º$ and $\angle PLM = 50º$, PN = NM and PO is parallel to LM.

Find the value of ∠LPM. (3 marks)



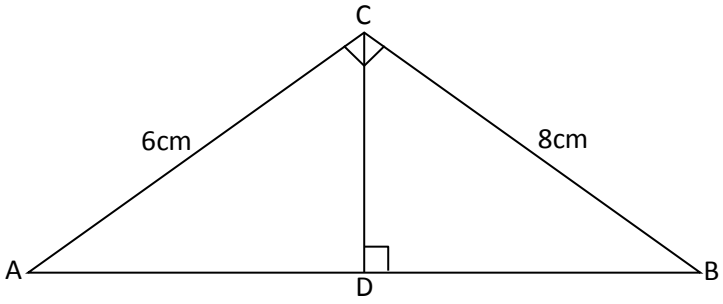
9. Using ruler and pair of compass only, construct triangle ABC in which AB = 6cm, BC = 8cm and angle ABC = 45º. Drop a perpendicular from A to meet BC at M. Measure AM and AC. (3 marks)

10. A plane leaves town P to town Q on a bearing of 130º and a distance of 350km. it then flies 500km on a bearing of 060º to town R. Find, by scale drawing the distance between town R and town P. (3 marks)

11. Use tables of reciprocal and squares to evaluate, to 4 significant figures, the expression:

$$0.4346^2 + \frac{1}{27.46}$$ (3 marks)

12. The figure **below** shows a triangle ABC which is right-angled at C. CB = 8cm and AC = 6cm. Find the length of CD given that CD is perpendicular to AB. (3 marks)



13. Solve for t in the equation: $32^{(-3)} \div 8^{(-4)} = 64 \div 2^t$. (3 marks)

14. A is a reflex angle and tan A = $\frac{7}{24}$. Determine the value of Cos A without using the Mathematical table or calculator. (2 marks)

15. Translation T is represented by the column vector $\begin{pmatrix} 5 \\ 4 \end{pmatrix}$ and another translation U by the column Vector (-3) . A point P is mapped to a point Q by T and point Q is mapped to a point R by U. 2

If point R is at (7, - 4), determine the coordinates of point P. (3 marks)

16. On the grid provided,

(i) Plot the points P (4, -1), Q (5, -3), R (4, -4) and S (3, -3) and join the points to form a polygon PQRS. State the name of the polygon formed. (2 marks)

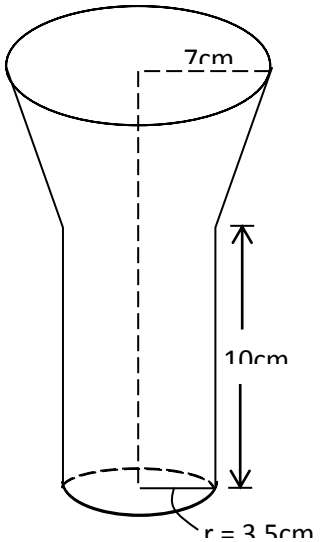
(ii) Write down the equation of the line of symmetry of the polygon. (1 mark)

SECTION II: (50 MARKS)

Answer any FIVE questions in this section.

17. The capacity of two similar rectangular tanks are 1,000,000 litres and 512,000 litres respectively.
    (a) Determine the length of the larger tank if the smaller one is 240cm long. (4 marks)
    (b) Calculate the surface area of the smaller tank if the larger tank's surface area is 1875m² (3 marks)
    (c) Estimate the mass of the smaller tank if the mass of the larger one is 800kg.(3 marks)

18. The diagram **below** represents a model of a pillar. The radii of the top and the base are 7cm and 3.5cm respectively. The height of the cylindrical part is 10cm while the height of the whole pillar is 15cm.



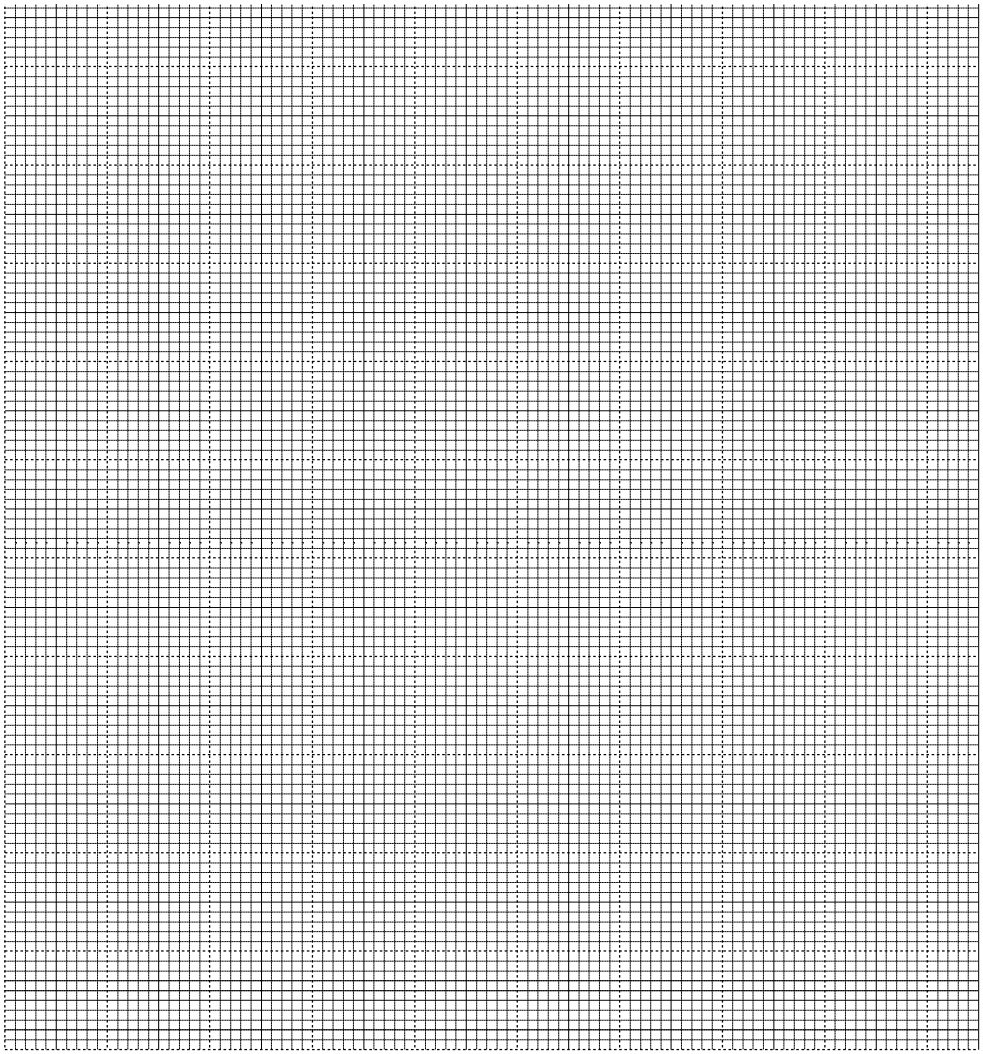
    (a) Calculate the volume of the model in cm³. (6 marks)
    (b) Calculate the mass of the material used to construct the pillar given that the actual height of the whole pillar is 60m and the density of the material used is 0.832g/cm³. (Give your answer in tones). (4 marks)

19. (a) Use the quadratic formula to solve the equation.
    $2\chi^2 - 9\chi + 3 = 0$ giving your answer to 4 significant figures. (3 marks)
    (b) Simplify the expression completely: $\frac{(-5\chi + 2\chi^2)(+\chi)}{16\chi^4 - 18}$ (4 marks)
    (c) If the expression $25y^2 - 70y + (16 + K)$ is a perfect square; where K is a constant; find the value of K. (3 marks)

20. Christians who attended a church service on a Sunday were grouped by age as shown in the table below.

Age in χ years	$0 \le x < 5$	$5 \le x < 15$	$15 \le x < 25$	$25 \le x < 45$	$45 \le x < 75$
No. of members	14	41	59	70	15

    (a) Estimate the mean age (4 marks)
    (b) On the grid provided, draw a histogram to represent the distribution.
    Use the scale: 1cm to represent 5 units on the horizontal axis.
    2cm to represent 5 units on the vertical axis. (4 marks)
    (c) On the same axes in (b) above, construct a frequency polygon and use it to determine the modal class. (2 marks)



21. Nairobi and Eldoret are each 250km from Nakuru. At 8.15a.m, a lorry leaves Nakuru for Nairobi. At 9.30am, a car leaves Eldoret for Nairobi via Nakuru at a speed of 100km/h. Both vehicles arrived Nairobi at the same time.

(a) Calculate their time of arrival in Nairobi. (2 marks)

(b) Find the cars speed relative to that of the lorry. (4 marks)

(c) How far apart are the vehicles at 12.45pm. (4 marks)

22. (a) Complete the table **below**, for the function $y = -\chi^2 + 2\chi + 6$.

(2 marks)

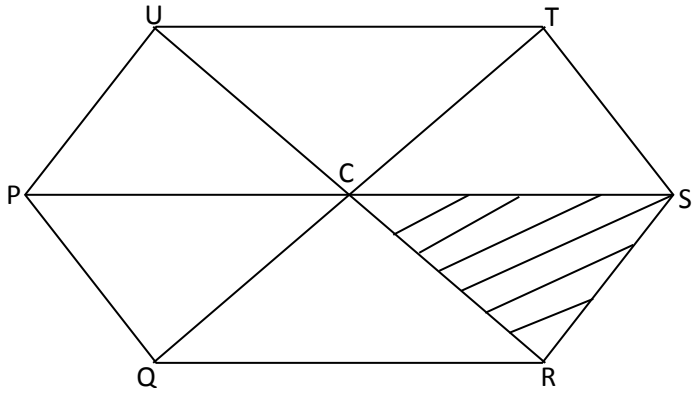
χ	-2	-1	0	1	2	3	4	5	6
$-\chi^2$			0						
$2\chi + 6$			6						
y			6						

(b) On the grid provided, draw the graph of the function $y = -\chi^2 + 2\chi + 6$ for the range $-2 \leq \times \leq 6$ and use your graph to estimate the roots of the equation $-\chi^2+2\chi+6=0$ to 1 decimal place (4 marks)

(c) To solve graphically the equation $\chi^2+2\chi=0$; a straight line must be drawn to intersect the curve $y=-\chi^2+2\chi+6$. Determine the equation of this straight line; draw the straight line

on the same axes and hence obtain the roots of the equation $\chi^2+2\chi=0$ to 1 decimal place (4 marks)

23. In the figure **below**, PQRSTU is a regular hexagon.



(a) Describe fully:

(i) a reflection that maps ΔSCR onto ΔSTC. (1 mark)

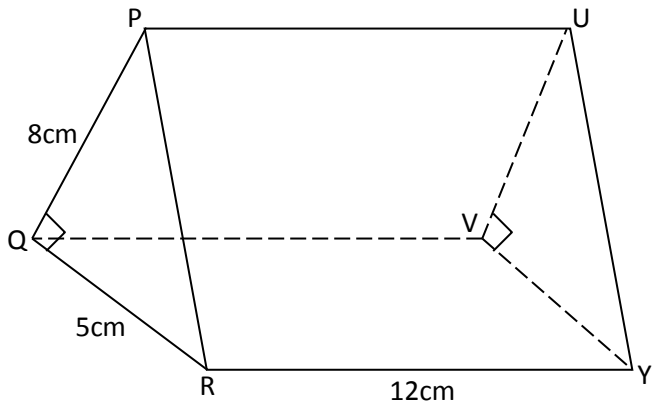
(ii) an enlargement that maps ΔSCR on ΔPCU. (2 marks)

(iii) a rotation that maps ΔSCR to ΔTCU. The ΔPQC is reflected on the line RU. The image of ΔPQC under the reflection is then rotated through an angle -120º about point C. Determine the images of P and Q:

(i) under the reflection. (2 marks

(ii) after the two successive transformations. (2 marks)

24. The figure **below** shows a wedge in which PQR and UXY are congruent right angled triangles. PQ = 8cm, QR = 5cm and RY = 12cm.



(a) Calculate:

(i) the length of RU. (2 marks)

(ii) the angle the line RU makes with the plane PQVU. (2 marks)

(b) Find the angle between:-

(i) line PY and the plane QRYV. (3 marks)

(ii) the planes PQVU and PRYU. (3 marks)