



121/2

**- MATHEMATICS -**  
**(alt A)**

**Paper 2**

**POST MOCK,  
2024**

**T2– Time 2 ½ hours**

Name ..... Adm Number.....

Candidate’s Signature ..... Date .....

**INSTRUCTIONS TO CANDIDATES**

1. Write your name, index number and class in the spaces provided above.
2. The paper contains two sections: **Section I** and **Section II**.
3. This paper contains **14 PRINTED** pages make sure all **PAGES ARE PRINTED** and **NON IS MISSING**
4. Answer **ALL** the questions in **Section I** and **ANY FIVE** questions from **Section II**.
5. All working and answers must be written on the question paper in the spaces provided below each question.
6. Marks may be awarded for correct working even if the answer is wrong.
7. Negligent and slovenly work will be penalized.
8. Non-programmable silent electronic calculators and mathematical tables are allowed for use.

**For examiners use only**

**Section I**

|   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |       |
|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|-------|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | Total |
|   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |       |

**Section II**

|    |    |    |    |    |    |    |    |       |
|----|----|----|----|----|----|----|----|-------|
| 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | Total |
|    |    |    |    |    |    |    |    |       |

**Grand**

**Total**



**T2MATHS2024**

**POST MOCK,  
2024**

**TURN OVER**

**SECTION I: (50 MARKS)**

**Attempt all questions in the spaces provided**

1. An irregular 6 sided polygon has two of its interior angles equal to  $2x$  each, three angles equal to  $x$  each and one side equal to  $20^\circ$   
Calculate the value of  $x$  (3marks)
  
  
  
  
  
  
  
  
  
  
2. The diagonals of a parallelogram are 20cm and 28.8cm. The acute angle between the diagonals is  $62^\circ$ .  
Calculate the area of the parallelogram. (3marks)
  
  
  
  
  
  
  
  
  
  
3. A mobile phone seller gets a commission of shs 250 on every mobile phone that he sells. In a given month he got 33,000 shillings.
  - a. How many phones did he sell that month (1mark)
  
  
  
  
  
  
  
  
  
  
  - b. If this commission is 2% what is the sale price of each mobile phone. (2marks)

4. Given that  $\sin x = 3/4$ , without using tables or calculators, find.

a.  $\cos x^\circ$

(2marks)

b.  $\tan (90-x)^\circ$

(1mark)

5. Solve the simultaneous equation

$$2\log y = \log 2 + \log t$$

$$2^y = 4^t$$

(4marks)

6. Evaluate without using tables or a calculator

$$100^{-1.5} \times 32^{0.2}$$

(3marks)

7. The angle subtended by the major arc at the center of the circle O is twice the angle subtended by the minor arc at the center. If the radius of the circle is 3.5cm. Find the length of the minor arc. (3marks)
8. Two trains  $T_1$  and  $T_2$  travelling in the opposite directions on a parallel tracks are just beginning to pass one another. Train  $T_1$  is 72m long and is travelling at 108km/hr. Train  $T_2$  is 78m long and is travelling at 72km/hr. Find the time in seconds the two trains take to completely pass one another (3marks)
9. The angle of depression of a chick from the hawk on top of a vertical tree 8m tall is  $28^\circ$ . On seeing the hawk, the chick moves directly towards the base of the tree to a point P such that the angle of elevation of the hawk from P is  $32^\circ$ . Calculate the distance moved by the chick. (4marks)

10. Find a 2 x 2 matrix m such that

(3marks)

$$\begin{pmatrix} 1 & 3 \\ 2 & -1 \end{pmatrix} m + \begin{pmatrix} 4 & -6 \\ 2 & 0 \end{pmatrix} = \begin{pmatrix} 1 & 7 \\ 3 & -2 \end{pmatrix}$$

11. Given that  $a=1.2$ ,  $b=0.02$  and  $c=0.2$  Express  $ac + b$  in the form  $\frac{m}{n}$  where m and n are integers

(3mark)

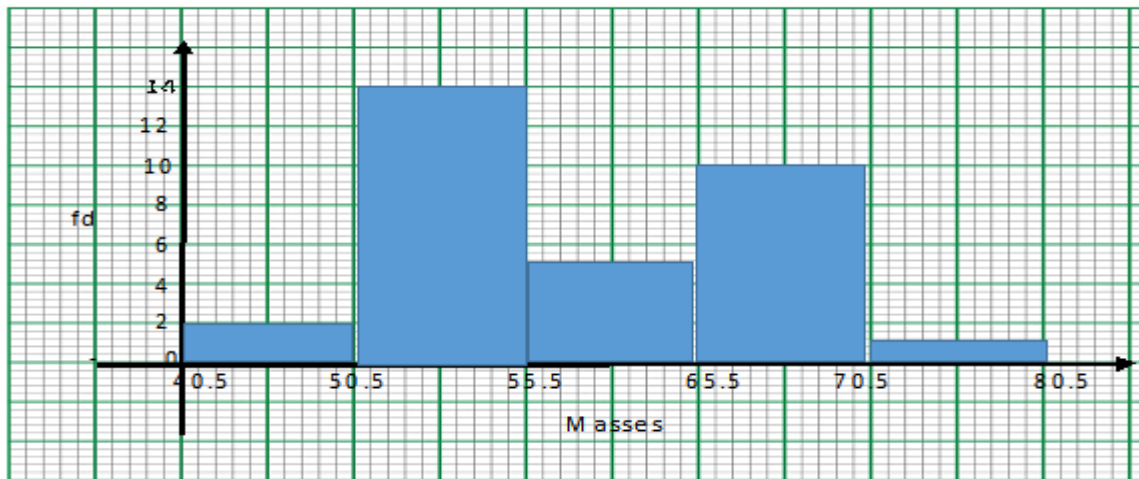
12. The line passing through the point P(-1,3w) and Q(w,3) is parallel to another line whose equation is  $2y - 3x = 9$ .

Write down the co-ordinates of P and Q

(3marks)

13. A certain volume of solution has a mass of 2.2kg with density of  $0.8\text{g/cm}^3$ . Calculate the volume of the solution in liters (3marks)

14. The graph below shows frequency densities for the masses of same 200 students selected from a class. Use it to answer the questions that follows.



(a) Complete the frequency distribution table below. (2 marks)

|            |  |  |  |  |  |
|------------|--|--|--|--|--|
| Mass in kg |  |  |  |  |  |
| frequency  |  |  |  |  |  |

(b) State the modal frequency (1mark)

15. Calculate the area bounded by the curve  $y=x^2$ , the line  $y= -1$  and the lines  $x=0$  and  $x=3$  using trapezoidal rule with 7 ordinates (correct to 3 d p)

(3marks)

16. Mutai imports rice from United States at the initial cost of 500 US dollars per tonnes. He then pays 20% of this amount as shopping costs and 10% of the same amount as custom duty. When the rice reaches Mombasa he has to pay 6% of the initial cost to transport it to Nairobi. Given that on the day of this transaction the exchange rate was 1 us dollar =kshs 76.60. calculate the total cost of importing one tonne of rice up to Nairobi in Kenya shillings.

(3marks)

**SECTION II (50 MARKS)**

**Answer any five questions from this section**

17. Three consecutive terms of aGP are  $(x+2)$ ,  $(x-2)$ , and  $(x-5)$ . Find:-

a). The value of  $x$ . (3marks)

b). The common ratio (1mark)

c). Given that  $x+2$  is the third term of the G.P

Find;

i). The first term giving your answer as a mixed fraction. (3marks)

ii). the sum of the first six terms correct to 2 d.p (3marks)



18. A form 1 stream at Butere mixed day secondary school has 15 boys and 25 girls. The probability of a girl reaching form 4 is  $\frac{2}{5}$  and that of a boy is  $\frac{3}{5}$ . If a girl reaches form 4 then probability that she gets employed is  $\frac{2}{3}$  while the probability that a girl gets employed without reaching form 4 is  $\frac{1}{3}$ . If a boy reaches form 4 the probability that he gets employed is  $\frac{3}{4}$  while the probability that a boy gets employed without reaching form 4 is  $\frac{1}{4}$ .

a). Draw a tree diagram to illustrate the above information. (2marks)

b). Using your tree diagram, determine:-

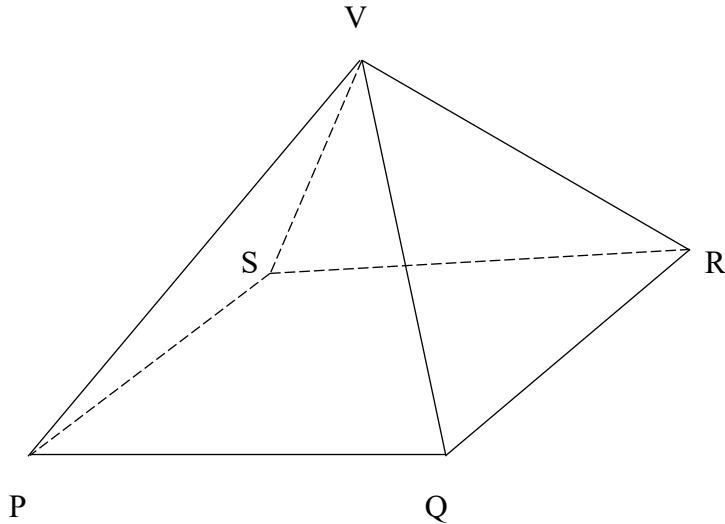
i) the probability that a girl gets employment. (2marks)

ii). the probability any child who has been to school gets employed. (2marks)

iii). the probability that a boy fails to get employment. (2marks)

iv). The probability that anybody who has studied upto form 4 fails to get employment.(2marks)

19. The diagram below shows a right pyramid VPQRS with V as the vertex and rectangular base PQRS. PQ=3cm, QR=4cm and the height of the pyramids is 6cm. M and N are the mid-points of PQ and QR respectively.



a). Calculate

i). the length PV (3mks)

ii). the angle between face VPQ and the base PQRS (2marks)

b). i). the slant height VM and VN. (2marks)

ii). the surface area of the pyramid. (3marks)

20. Two towns A and B lie on the same parallel of latitude  $60^{\circ}\text{N}$ . If the longitude of A and B are  $42^{\circ}\text{W}$  and  $29^{\circ}\text{E}$  respectively.

a). Find the distance between A and B in nautical miles along the parallel of latitude. (2marks)

b). Find the local time at A if at B is 1.00.p.m. (2marks)

c). Find the distance between A and B in kilometre (Take  $\pi = \frac{22}{7}$  and  $R=6370\text{km}$ ) (2marks)

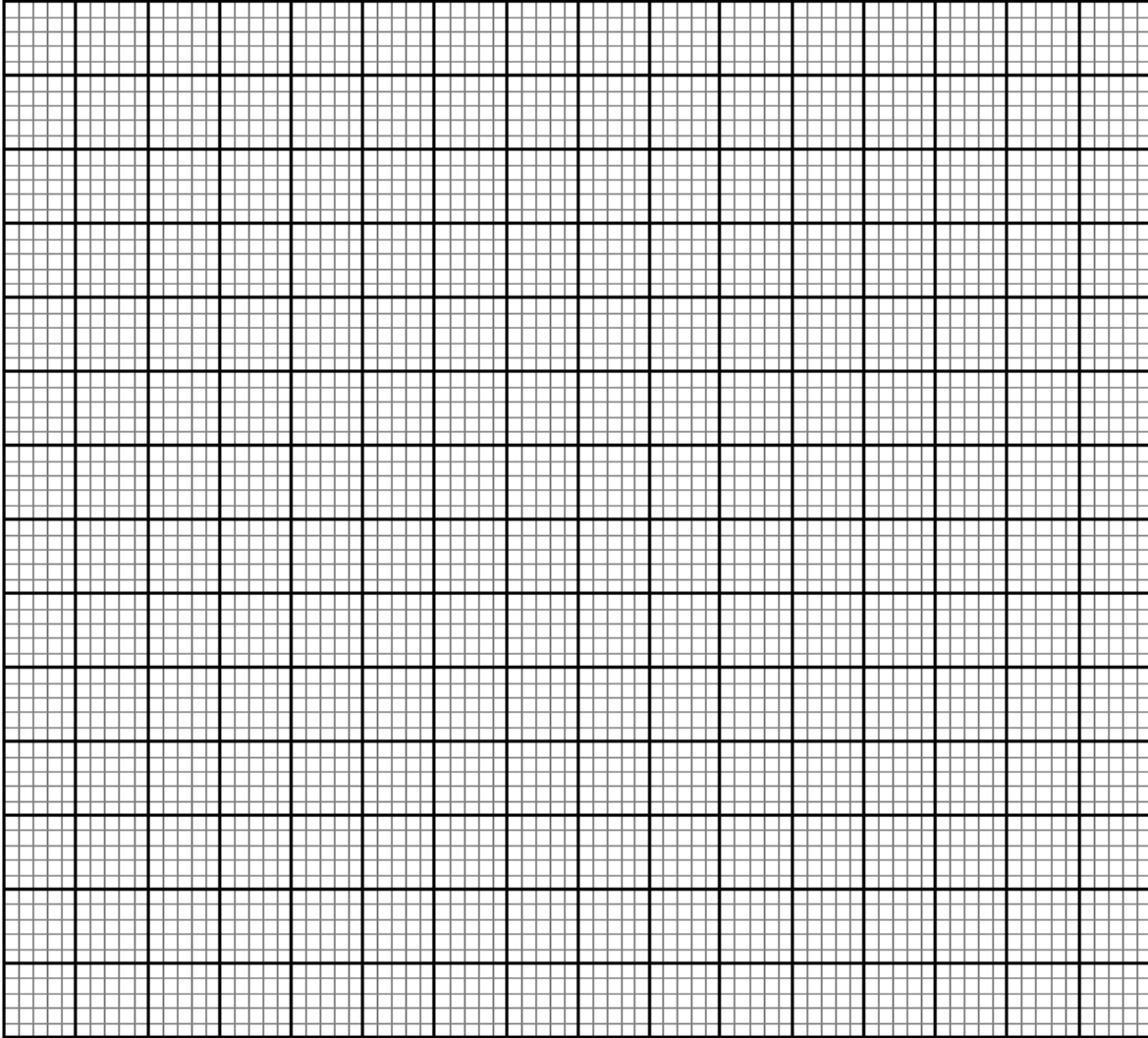
d). if C is another town due south of A and 1001km away from A, find the co-ordinate of C. (4marks)



21. The table below shows marks scored by students in a mathematics test.

|                |       |       |       |       |       |       |       |
|----------------|-------|-------|-------|-------|-------|-------|-------|
| Marks          | 30-39 | 40-49 | 50-59 | 60-69 | 70-79 | 80-89 | 90-99 |
| No of students | 2     | 3     | 8     | 12    | 15    | 6     | 4     |

a). Draw a cumulative frequency curve to represent the information. (4marks)



b). Use you graph to find:-

i). The median mark (1mark)

ii). The quartile deviation (3marks)

iii. the pass mark if 60% of the students passed. (2marks)

22. The initial velocity of a particle was  $1\text{m/s}$  and its acceleration is given by  $(2-t)\text{ m/s}^2$  every second after the start.

a). i). Determine the equation representing its velocity. (2marks)

ii). Find the velocity of the particle during the third second. (2marks)

b). i). Find the equation representing its distance  $t$  seconds after the start. (2marks)

ii). What was the distance covered by the particle during the first three seconds.(2marks)

c). Determine the time when the particle was momentarily at rest. (2marks)

23. a). using trapezoidal rule estimate the area bounded by the curve  $y=3x^2 - 2$  and the lines  $x = -4$ ,  $x=4$  and  $x$ -axis using 8 trapezia (2marks)

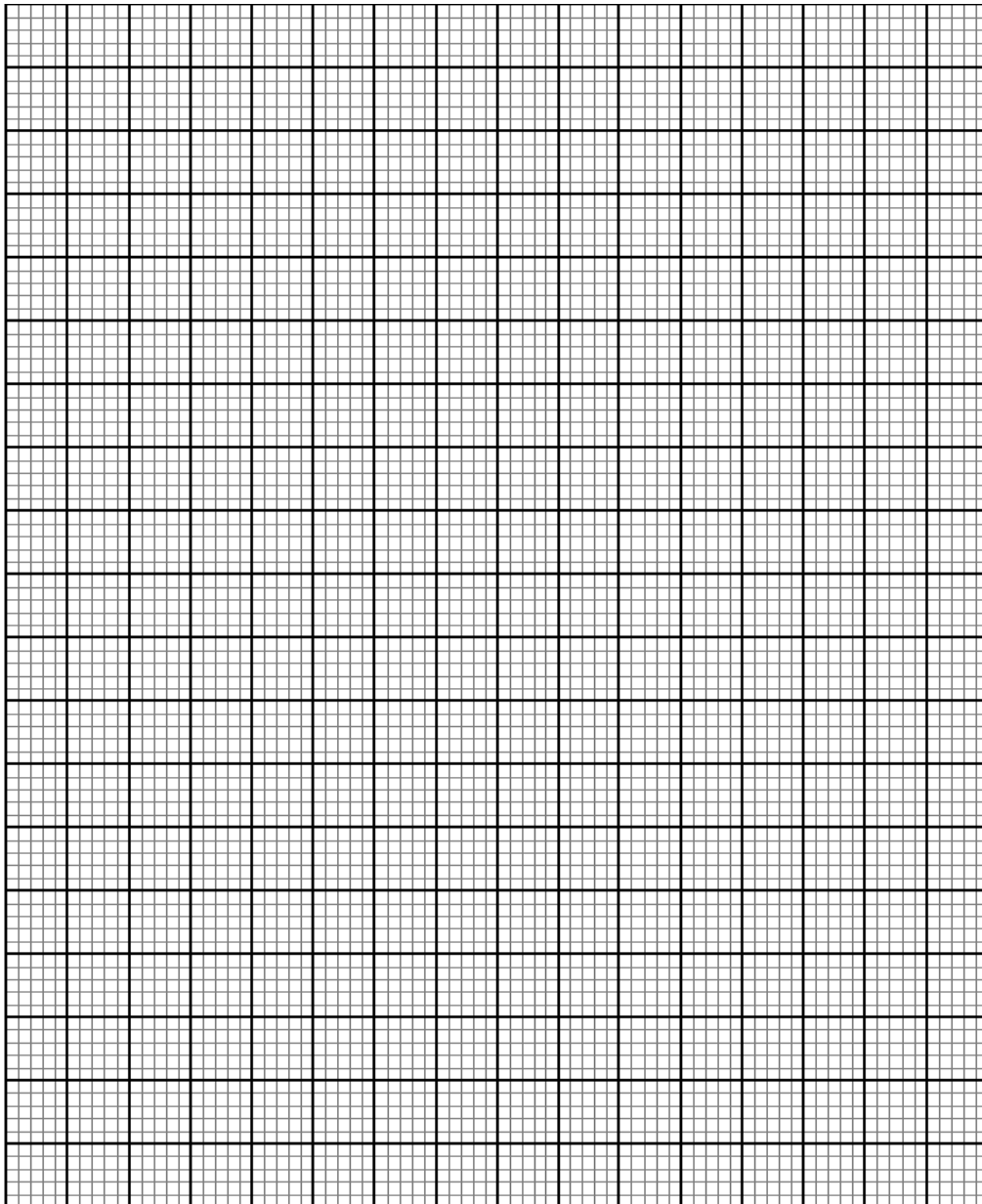
b). Find the actual area bounded by the curve  $y=3x^2 -2$  and the lines  $x= -4$ ,  $x=4$  and  $x$ -axis. (3marks)

c). Calculate the percentage error when trapezoidal rule is used. (3marks)

24. The vertices of triangle PQR are P(1,1), Q(4,1) and R(5,4). A transformation represented by a matrix  $T = \begin{pmatrix} -1 & 0 \\ 0 & 1 \end{pmatrix}$  maps triangle PQR onto triangle P<sup>I</sup>Q<sup>I</sup>R<sup>I</sup>.

A second transformation represented by  $U = \begin{pmatrix} 1 & 0 \\ 0 & -1 \end{pmatrix}$  maps triangle P<sup>I</sup>Q<sup>I</sup>R<sup>I</sup> onto triangle P<sup>II</sup>Q<sup>II</sup>R<sup>II</sup>.

a). On the same axis draw the three triangles PQR, P<sup>I</sup>Q<sup>I</sup>R<sup>I</sup> and P<sup>II</sup>Q<sup>II</sup>R<sup>II</sup> and state the coordinates of triangle P<sup>I</sup>Q<sup>I</sup>R<sup>I</sup> and P<sup>II</sup>Q<sup>II</sup>R<sup>II</sup>. (6marks)





- b). Describe a single transformation which maps triangle PQR onto triangle  $P''Q''R''$  and find its.....matrix. (4marks)

**THIS IS THE LAST PRINTED PAGE**