

KCSE MOCKS

MATHEMATICS PAPER 1

Consists 3 KCSE Mock set Exams.
(Class of KCSE March 2021)

For Marking Schemes Contact Mr Machuki
0795491185

Kenya Educators Contacts:

+254795491185

kenyaeducators@gmail.com

**For more e-learning resources contact Kenya
Educators via the contacts above.**

FOR MARKING SCHEMES CALL/TEXT/WHATSAPP 0795491185

PRE-MOCK 1

Name:

Class: Adm.No.....

School:

Date:

Sign:.....

121/1

MATHEMATICS

PAPER 1

TIME: 2 ½ HOURS

KCSE PRE-MOCK SET 1

Kenya Certificate to Secondary Education

MATHEMATICS (PAPER 1)

TIME: 2 ½ HOURS

Instructions

- Write your name, class, admission number, school, date and signature in spaces provided above.
- The paper contains **two** sections **A** and **B**.
- Answer **all** questions in section **A** and **any five** questions from section **B** in the spaces provided below each question.
- Show all the steps in your calculations giving your answers at each stage in the spaces below each question.
- Non-programmable silent electronic calculator and mathematical tables may be used except where stated otherwise.

For Examiner's Use Only

SECTION A

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

SECTION B

17	18	19	20	21	22	23	24	TOTAL
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**PERCENTAGE
SCORE**

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SECTION A (50 MARKS)

Answer **all** questions in this section in the spaces provided

1. Without using a calculator or mathematical tables, evaluate: **(3 marks)**

$$\frac{8 \div 2 + 12 \times 9 - 4 \times 6}{56 \div 7 \times 2}$$

2. A farmer has a piece of land measuring 840m by 396m. He divides it into square plots of equal size. Find the maximum area of one plot. **(3 marks)**

3. Use factor method to evaluate the expression below leaving your answer as a product of its prime factors in power form. **(3 marks)**

$$\sqrt{5184 \times 49}$$

4. Simplify completely.

(3 marks)

$$\frac{2mx + 3px - 2mk - 3pk}{x - k}$$

5. The length of a rectangle has increased in the ration 3 : 2 and the width reduced in the ratio 4 : 5. If the original length and width were 18 cm and 15 cm respectively. Find the ratio of change in its area. **(3 marks)**

6. A boy has a metal of density 14000kg/m^3 .He intends to use it to make a rectangular pipe with external dimensions of 18cm by 10cm and internal dimensions of 15cm by 8cm.The length of the pipe is 150cm .Calculate the mass of the pipe in kg.

(3 marks)

7. A two-digit number is 18 more than the number formed by reversing the digits. If the sum of the digits is 10. Find the number. **(3 marks)**

8. In a regular polygon each exterior angle is 90° less than each interior angle. Calculate the number of sides of the polygon hence give its name. **(3 marks)**

9. Use tables of cubes, cube roots and reciprocals, correct to four significant figures, to evaluate: **(4 marks)**

$$\left\{ 3.479^3 + \frac{5}{0.01732} \right\}^{\frac{1}{3}}$$

10. Solve for y in the equation

(3 marks)

$$27^y + 3^{3y} - 5 = 49$$

11. Find the equation of the perpendicular to the line $x + 2y = 4$ that passes through the point $(3, 2)$. Express your answer in the form $y = mx + c$.

(3 marks)

12. Solve the inequalities and represent the solution on a number line.

(3 marks)

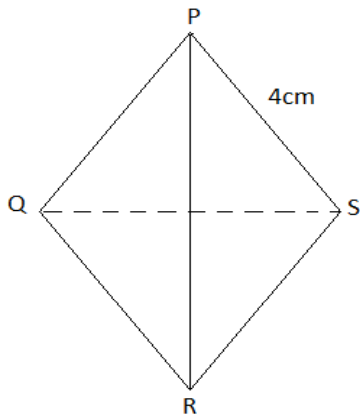
$$\frac{x-3}{-3} < 1$$

$$3x + 1 > -17$$

13. The figure PQRS below is a regular tetrahedron of side 4cm.

Draw its net and find the surface area.

(3 marks)



14. Two similar solids whose densities are each 1g/cm^3 are such that the first has a height of 5 cm and a volume of 120 cm^3 . The second has mass of 3240g. Find the height of the second solid.

(3 marks)

15. A bank in Canada offers the following exchange rates between Canadian dollars (CAD) and Euros (EUR) .The bank sells 1CAD for 0.82EUR and buys 1CAD for 0.78 EUR. A customer wishes to exchange 800 CAD for Euros. After spending 200 Euros he decided to sell the remaining Euros. How much Canadian dollars did he get after selling the remaining amount to the bank? **(3 marks)**
16. Given the curve $y = x^3 - 3x - 1$, find the equation of the tangent to the curve at the point (1,-3). **(4 marks)**

SECTION B (50 MARKS)

*Answer any **five** questions in this section*

17. Wafula left Bungoma at 8.00 a.m. towards Nairobi through Kisumu at an average speed of 90 km/hr. Kilima also left Bungoma at 8.21 a.m. towards Nairobi along the same road at an average speed of 97 km/hr.

(a) Determine

(i) the time Kilima caught up with Wafula. **(4 marks)**

(ii) the distance from Bungoma when Kilima caught up with Wafula. **(2 marks)**

(b) Musumba left Kisumu towards Bungoma on the same day at 8.40 a.m. at an average speed of 80km/hr. He met Wafula after 45 minutes of his drive. Determine the distance between Bungoma and Kisumu. **(4 marks)**

18. A school ordered books worth Ksh. 28,000 priced at Ksh. X each. Because of the number involved the supplier reduced the price of each book by Ksh. 10 and the school finally decided to spend Ksh. 27,300 on the books.

(a) Write down expressions for

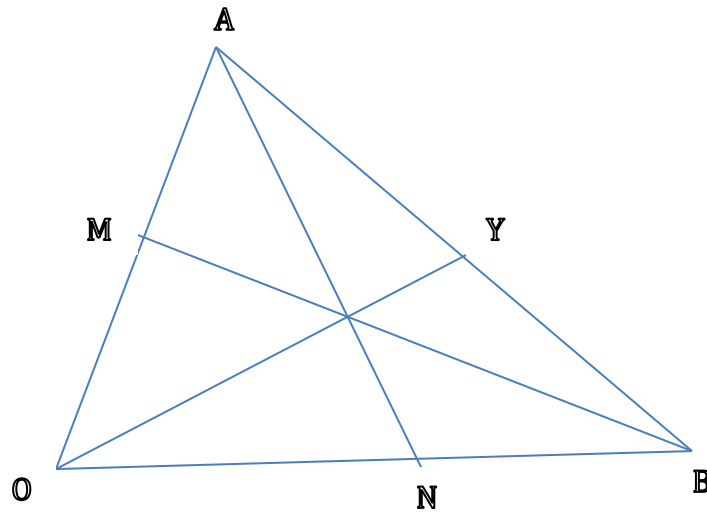
(i) The number of books originally ordered. **(1 mark)**

(ii) The number of books finally obtained. **(1 mark)**

(b) If the second number is 10 more than the first, write down the equation which X satisfy. Hence find the price at which the school bought the books. **(6 marks)**

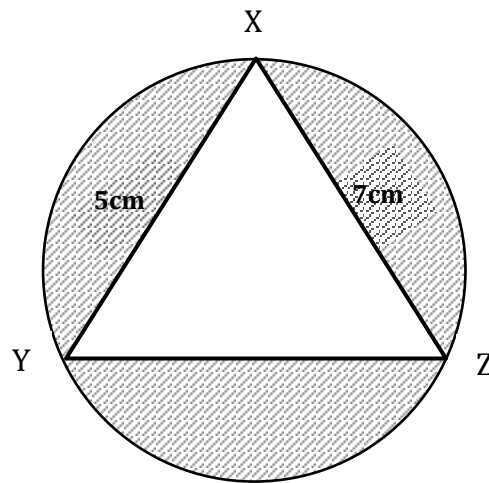
(c) Find the ratio of the number of books to be bought originally to the number of books bought finally. **(2 marks)**

19. The figure below is triangle OAB in which $\mathbf{OA} = \mathbf{a}$ and $\mathbf{OB} = \mathbf{b}$. M and N are points on $\mathbf{OA}$ and $\mathbf{OB}$ respectively such that $OM:MA = 1:3$ and $ON:NB = 2:1$.



- (a) Express the following vectors in terms of $\mathbf{a}$ and $\mathbf{b}$
- (i) $\mathbf{AM}$ (1 mark)
- (ii) $\mathbf{BM}$ (1 mark)
- (iii) $\mathbf{AB}$ (1 mark)
- (b) Lines AN and BM intersect at X such that $AX = hAN$ and $BX = kBM$. Express OX in two different ways and find the value of h and k. (6 marks)
- (c) OX produced meets AB at Y such that $AY:YB = 3:2$. Find AY in terms of a and b. (1 mark)

20. The figure below shows circumscribed circle centre C. Chords XY and YZ measures 5cm and 7cm respectively. Angle $YXZ = 48^\circ$.



Calculate;

- (a) the length of chord YZ **(3 marks)**

- (b) the radius of the circle. **(2 marks)**

- (c) Area of the triangle XYZ **(2 marks)**

- (d) Area of the shaded region. **(3 marks)**

21. Draw the graph of $y = 2x^2 + x - 1$ for $-4 \leq x \leq 4$. Use a scale of 1 cm to represent 1 unit on the x-axis and 1cm to represent 2.5 units on the y-axis. **(3 marks)**

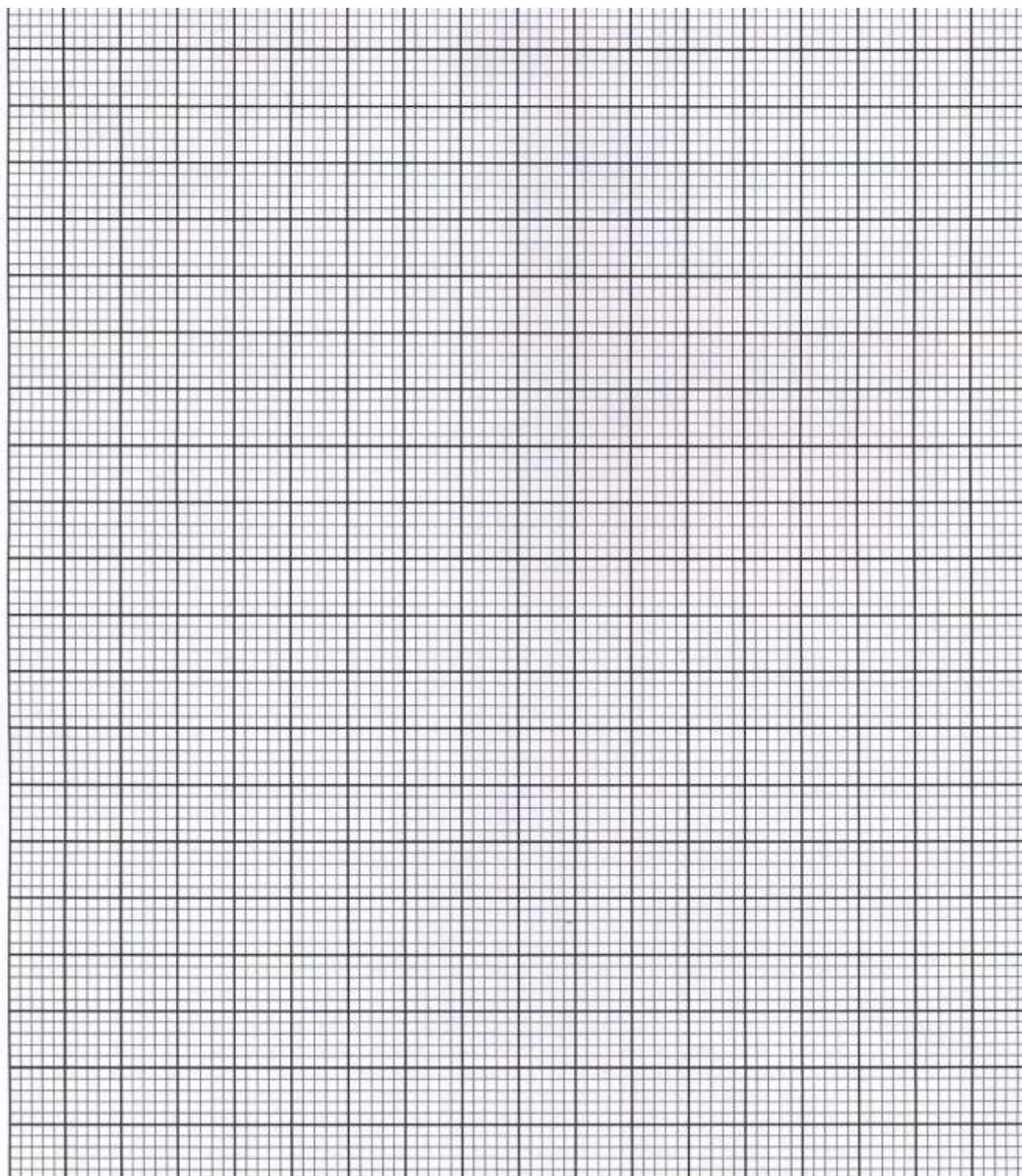
x	-4	-3	-2	-1	0	1	2	3	4
y									

Use the graph to solve;

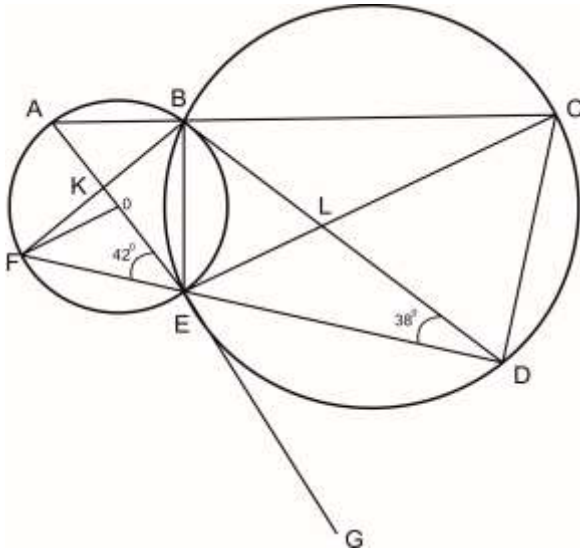
(a) $2x^2 + x - 1 = 0$ **(1 mark)**

(b) $2x^2 + x - 11 = 0$ **(3 marks)**

(c) $2x^2 - 5 = 0$ **(3 marks)**



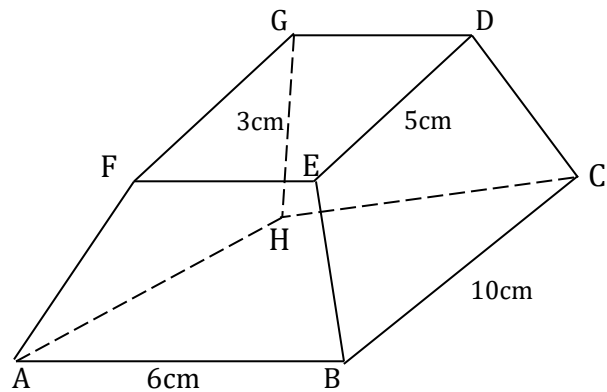
22. The figure below shows two circles ABEF and BCDE intersecting at B and E. ABC and FED are straight lines. The line AEG is a tangent to the circle BCDE at E. O is the centre of circle ABEF. AE and BF intersect at K while BD and CE intersect at L. Angle $AEF = 42^\circ$ and angle $BDE = 38^\circ$



Find the size of the following angles, stating the reasons in each case.

- | | | |
|-----|-----|-----------|
| (a) | BCE | (2 marks) |
| (b) | BEF | (2 marks) |
| (c) | FBE | (2 marks) |
| (d) | ELD | (2 marks) |
| (e) | KFO | (2 marks) |

23. The figure below shows a frustum of a right pyramid whose top face is a rectangle of side 3 cm by 5 cm and the bottom face is also a rectangle of side 6 cm by 10 cm. The perpendicular distance between the top and bottom faces (height) is 25 cm.



Find;

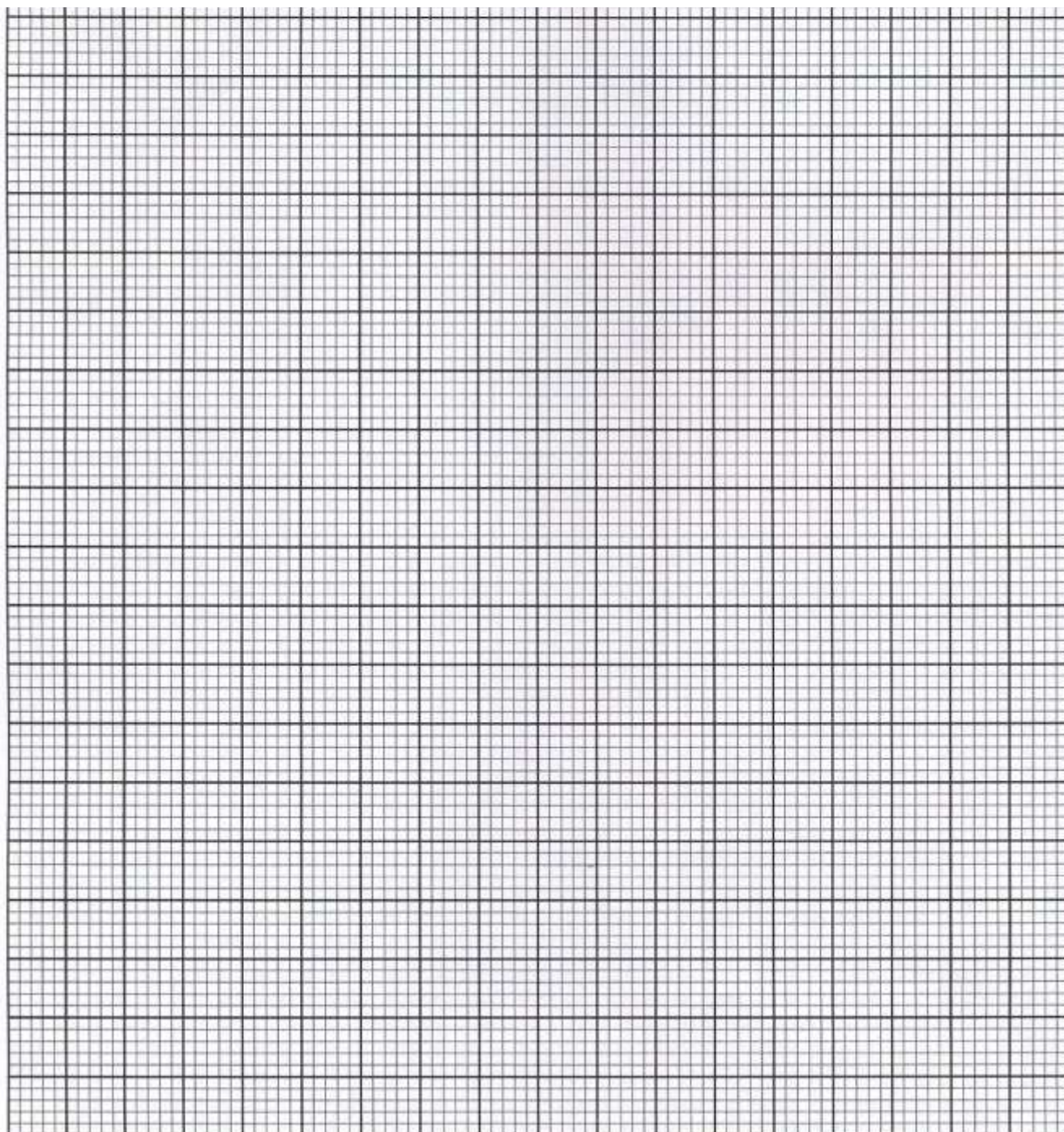
(a) the volume of the frustum.

(6 marks)

(b) The surface area of the frustum.

(4 marks)

24. PQR is a triangle with coordinates; P(3, 3), R (2, 1) and Q(5, 1). P'Q'R' is the image of PQR under an enlargement such that the coordinates are P'(-3, 0), Q'(-7, 4) and R'(1, 4). Using a scale of 1:1 on both axes;
- (a) (i) Plot PQR and P'Q'R' hence locate the centre of enlargement by construction. **(4 marks)**
- (ii) State the scale factor of the enlargement. **(2 mark)**
- (b) P''Q''R'' is the image of PQR under a translation $T\left(\frac{1}{3}\right)$. Plot P''Q''R''. **(2 marks)**
- (c) P'''Q'''R''' is the image of PQR under a reflection whose mirror line is $y = -2$. Plot P'''Q'''R'''. **(2 marks)**



MOCK 1

NAME: INDEX NO:

CLASS:

DATE:

121/1

MATHEMATICS

PAPER 1

TIME: 2 ½ HOURS

KCSE MOCK 1

INSTRUCTION

- Write your name and index number in the spaces provided above.
- Sign and write the date of the examination in the spaces provided above.
- This paper consists of **TWO** sections: **section I** and **Section II**.
- Answer **ALL** the questions in **Section I** and only **five** questions from **section II**.
- Show all the steps in your calculations, giving your answers at each stage in the stage in the spaces below each question.
- Marks may be given for correct working even if the answer is wrong.
- Non-programmable** silent electronic calculators **and** KNEC mathematical tables may be used, except where stated otherwise.

FOR EXAMINER'S 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

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SECTION 1: (50 MARKS)

ANSWER ALL THE QUESTIONS

1. Simplify completely

(4 mks)

$$\frac{2x^2 - 98}{3x^2 - 16x - 35} \div \frac{x+7}{3x+5}$$

2. Given that $x:y=1:2$ and $y:z=3:2$ find the value of $\frac{x+y}{2z+5x}$ (3mks)

3. Solve the simultaneous inequalities given below and list all the integral values of x . (3mks)

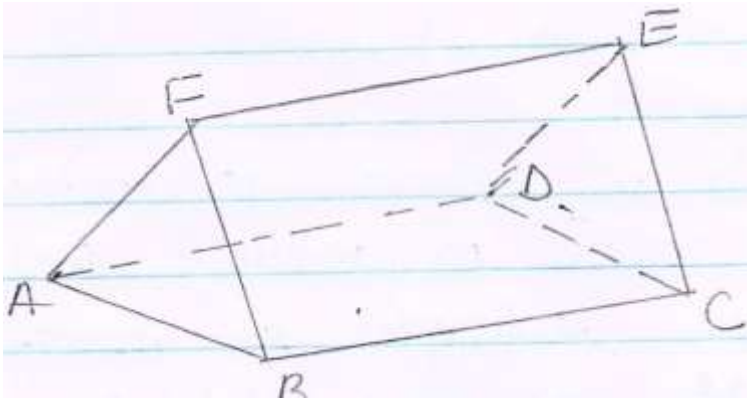
$$\frac{3-x}{2} \geq \frac{x+1}{3} \geq \frac{2x+1}{-3}$$

4. The sum of **K** terms of sequence **3,9,15,21.....**is **7500**. Determine the value of K. (3mks)

5. The length of a rectangle is **$(3x + 1)$ cm**, its width is **3 cm** shorter than its length. Given that the area of the rectangle is **28cm^2** , find its length. **(3 mks)**

6. The curved surface area of a cylindrical container is 1980cm^2 . If the radius of the container is 21cm, calculate to one decimal place the capacity of the container in litres. (Take $\pi = \frac{22}{7}$). **(4 mks)**

7. The figure below is a triangular prism ABCDEF with sides $AB = BF = AF = 3\text{cm}$ and $BC = AD = EF = 5\text{cm}$.



a. Draw the net of the solid.

(2mks)

b. Calculate the surface area of the solid. **(2mks)**

8. Two similar containers hold 2000cm^3 and 6.75litres respectively. If the smaller container has a diameter of 15.50cm , what is the radius of the larger container correct to one decimal place. **(3mks)**

9. A tourist on holiday in Kenya had US\$7500. She changed all the amount into Kenya Shillings at the rate of US\$ 1 = kshs. 80.04, While in Kenya she spent two thirds of the money and changed the remainder back to US\$ at US\$ 1 = kshs. 80.50. How much to the nearest US dollars did she get? **(3mks)**

10. Determine the **quartile deviation** of the following data. (2mks)

4,9,5,4,7,6,2,1,6,7,8,3

11. A farmer has a piece of land measuring 840m by 396m. He divides it into square plots of equal size. Find the maximum area of one plot. (3 mks)

12. A seven sided polygon has two of its interior angles as 140° and 160° and the remaining angles are equal. Find the size of one of the equal angles. (3mks)

13. If $P = \begin{pmatrix} 1 \\ 1 - y \end{pmatrix}$, $Q = \begin{pmatrix} 3 \\ y + 2 \end{pmatrix}$ and $|P| = |Q|$. Find the value of y . (3 mks)

14. Find the value of **x** if.

(3 mks)

$$\left(\frac{27}{8}\right)^{x+7} = \left(\frac{4}{9}\right)^{-3x}$$

15 .Use reciprocal and square tables to evaluate, **to 4 significant figures**, the expression. (3 mks)

$$\frac{1}{0.03654} - 4.151^2$$

16. The following were recorded on a field note book by a surveyor. Taking the base line as **550M** find the area in **M²**.

(3 mks)

		B		
		550	120	TO A
C	150	450		
		250	90	TO D
E	60	40		
		F		

SECTION II (50 MARKS)

Answer ONLY FIVE questions in this section

17. A tank has two water taps P and Q and another tap R. When empty the tank be filled by tap P alone in 5 hours or by tap Q in 3 hours .When full the tank can be emptied in 8 hours by tap R

a)The tank is initially empty . Find how long it would take to fill up the tank

i) If tap R is closed and taps P and Q are opened at the same time
(2mks)

ii) If all the three taps are opened at the same time .Giving your answer to the nearest minute **(2mks)**

b) Assume the tank initially empty and the three taps are opened as follows

P at 8:00 am

Q at 9:00 am

R at 9:00 am

i) Find the fraction of the time that would be filled by 10:00 am.
(3mks)

ii) Find the time the tank would be fully filled up. Give your answer to the nearest minute. **(3mks)**

18. A straight line L_1 has a gradient $-\frac{1}{2}$ and passes through point $P(-1, 3)$. Another line L_2 passes through the points $Q(1, -3)$ and $R(3, 5)$. Find.

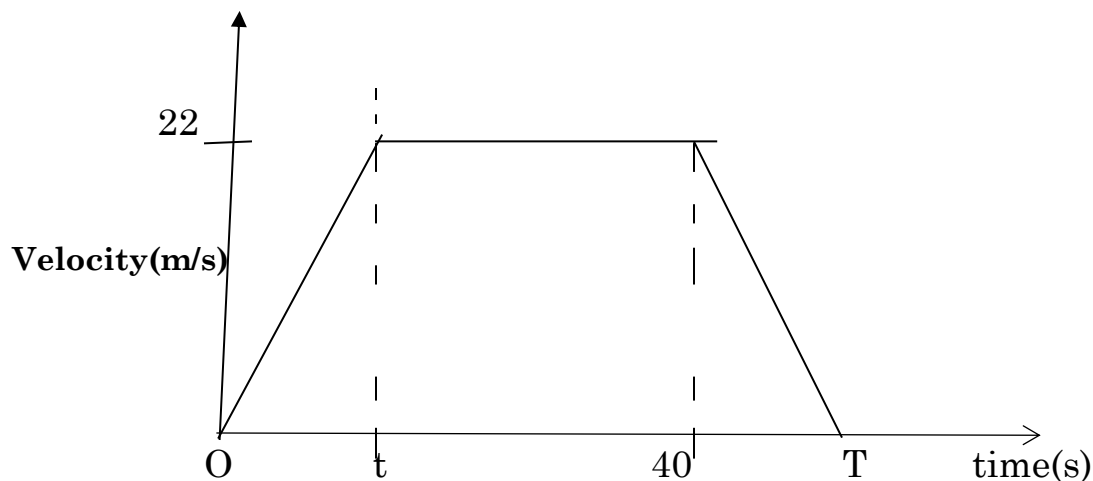
(a) The equation of L_1 . (2mks)

(b) The equation of L_2 in the form $ax+by+c=0$. (2mks)

(c) The equation of a line passing through a point $S(0, 1.5)$ and is perpendicular to L_2 . (3mks)

d) The point of intersection of a line passing through S and L_2 . (3mks)

19.The figure below shows a velocity – time graph of a car journey.



The car starts from rest and accelerates at 2.75m/s^2 for t seconds until its speed is 22m/s . It then travels at this velocity until 40 seconds after starting. Its brakes bring it uniformly to rest. The total journey is 847m long and takes T seconds.

Calculate the

(i) Value of t **(3mks)**

(ii) Distance travelled during the first t seconds. **(2mks)**

(iii) Value of T **(3mks)**

(iv) Final deceleration **(2mks)**

20. Four towns P, R, T and S are such that R is 80km directly to the north of P and T is on a bearing of 290° from P at a distance of 65km. S is on a bearing of 330° from T and a distance of 30 km. Using a scale of 1cm to represent 10km, make an accurate scale drawing to show the relative position of the towns. **(4mks)**

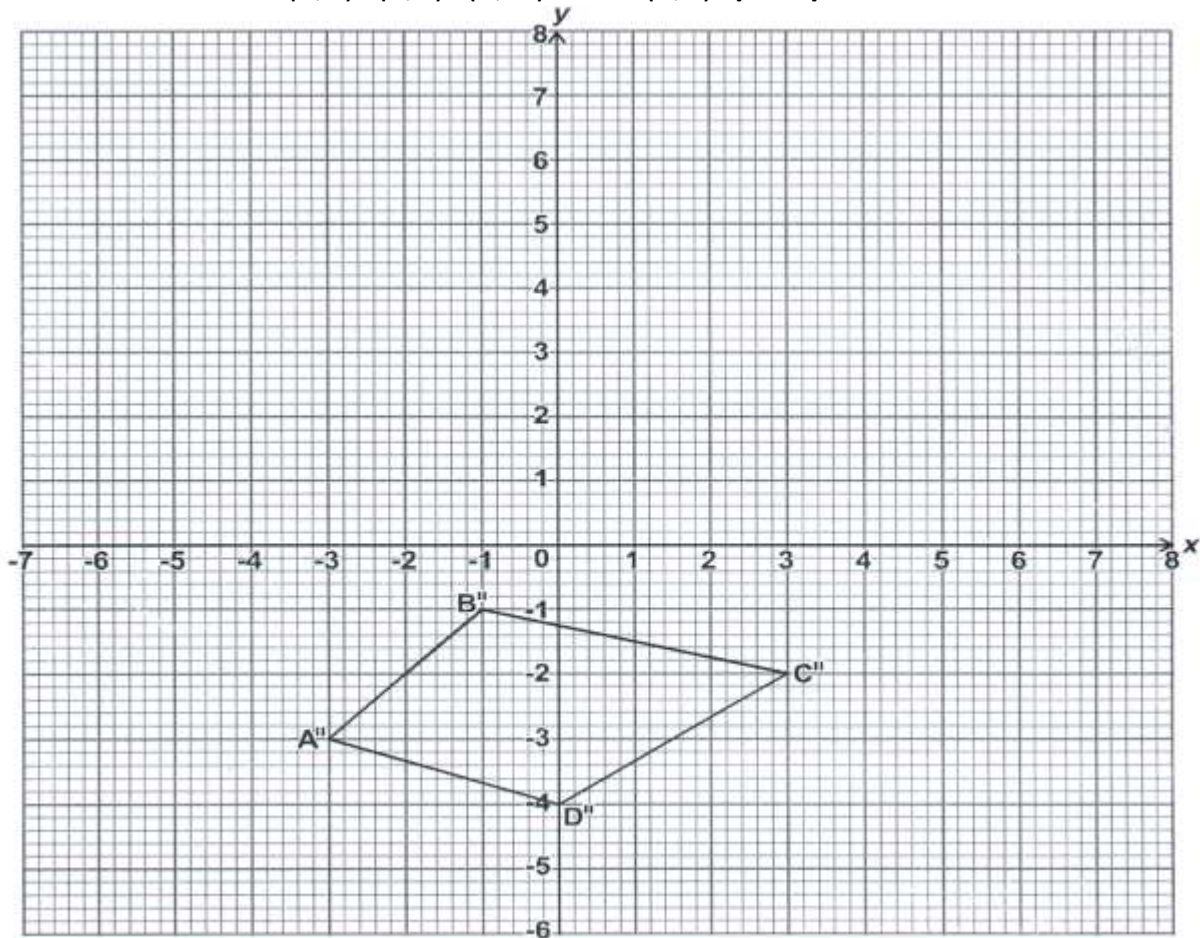
Find:

(a) The distance and the bearing of R from T. **(3mks)**

(b) The distance and the bearing of S from R. **(2mks)**

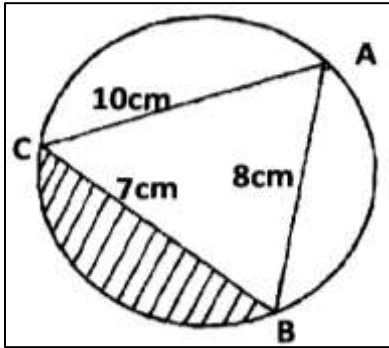
(c) The bearing of P from S **(1 mk)**

21. On the Cartesian plane given below, draw the quadrilateral ABCD with vertices A(6,6)B(2,2)C(4,-6) and D(8,0). **(1mk)**



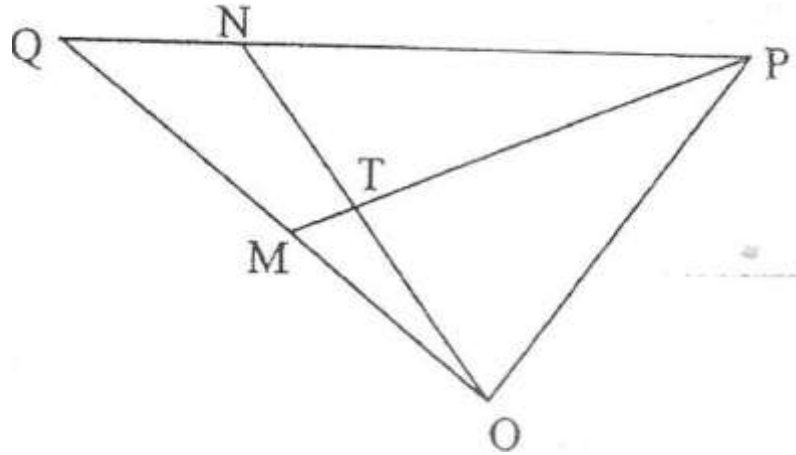
- Draw the image $A^1B^1C^1D^1$ of ABCD under enlargement scale factor $\frac{1}{2}$, centre origin. State the coordinate of $A^1B^1C^1D^1$ **(3mks)**
- Describe the transformation that maps $A^1B^1C^1D^1$ onto the given image $A^{11}B^{11}C^{11}D^{11}$ **(2mks)**
- Rotate $A^{11}B^{11}C^{11}D^{11}$ with center (-2,-1) through a positive quarter turn to get $A^{111}B^{111}C^{111}D^{111}$.state the coordinate of $A^{111}B^{111}C^{111}D^{111}$.**(3mks)**
- State a pair of quadrilateral that are oppositely congruent. **(1mk)**

22. The figure below shows a triangle **ABC** inscribed in a circle. **AC** = 10cm, **BC** = 7cm and **AB** = 10cm.



- (a) Find the size of angle **BAC**. (3 mks)
- (b) Find the radius of the circle. (2 mks)
- (c) Hence calculate the area of the shaded region. (5 mks)

23. The diagram below shows a triangle OPQ in which $QN:NP = 1:2$, $OT:TN = 3:2$ and **M** is the midpoint of **OQ**.



- a) Given that $\mathbf{OP} = \mathbf{p}$ and $\mathbf{OQ} = \mathbf{q}$, Express the following vectors in terms of $\mathbf{p}$ and $\mathbf{q}$

i) $\mathbf{PQ}$ (1 mk)

ii) $\mathbf{ON}$ (2 mks)

iii) $\mathbf{PT}$ (2 mks)

iv) $\mathbf{PM}$ (1 mk)

- b) (i) Show that point **P**, **T** and **M** are collinear. (3 mks)

(ii) Determine the ratio **MT: TP**. (1 mk)

24. A school in Murang'a East decided to buy x calculators for its students for a total cost of ksh.16,200. The supplier agreed to offer a discount of ksh.60 per calculator. The school was then able to get three extra calculators for the same amount of money.

(a) Write an expression in terms of x , for the

(i) Original price of each calculator. **(1mk)**

(ii) Price of each calculator after the discount. **(1mk)**

b) Form an equation in x and hence determine the number of
Calculators the school bought. **(5mks)**

c) Calculate the discount offered to the school as a percentage.
(3mks)

POST MOCK 1

NAME..... INDEX NO.....

CLASS ADM NO: DATE.....

SIGNATURE.....

121/1

MATHEMATICS

PAPER 1

TIME: 2½ HOURS

KCSE POST MOCK MOCK 1

Kenya Certificate of Secondary Education (K.C.S.E.)

Mathematics paper 1

INSTRUCTION TO CANDIDATE'S:

- ✓ Write your name, index number in the spaces provided at the top of this page.
- ✓ Sign and write the date of examination in spaces provided above.
- ✓ This paper consists of **TWO** sections: **Section I** and **Section II**.
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FOR EXAMINER'S 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

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This paper consists in 16 printed pages. Candidates should ensure that all the pages are printed as indicated and that no question is missing.

SECTION I: (50 MARKS)

Answer all the question in this section in the spaces provided:

1. Evaluate

$$\frac{(2\frac{1}{4} - \frac{3}{4}) \times 3\frac{2}{3} \div 2\frac{1}{5}}{1\frac{4}{6} \div 1\frac{1}{4}}.$$

(3mks)

2. Use square roots, reciprocal and square tables to evaluate to 4 significant figures the expression; $(0.06458)^{\frac{1}{2}} + \left(\frac{2}{0.4327}\right)^2$ (4mks)

3. Three similar 21 inch television sets and five similar 17 inch television cost Ksh.129,250. The difference between the cost of two 21inch television sets and four 17inch television sets is Ksh. 22,000. Calculate the price of a 21- inch television set and that of 17-inch television set. (3mks)

4. Simplify: (3 marks)

$$\left[\frac{a^3 - ab^2}{a^4 - b^4} \right]^{-1}$$

5. Solve for x in the equation.

(3 Marks)

$$9^{(2x-1)} \times 3^{(2x+1)} = 243$$

6. A classroom measures $(x + 2)$ m by $(x - 5)$ m. If the area of the classroom is 60m^2 .

Find its length.

(3 mks)

7. A tourist exchanged X US dollars for Kenya shilling when he arrived in Kenya. He spent three days in the country and paid Ksh 45,600 for expenses. He later left the country and exchanged the remainder back to US dollars. He went back with 1200 dollars. Find the value of X to the nearest dollar.

Buying 1 US dollar = Ksh.98.36

Selling 1US dollar = Ksh.98.54

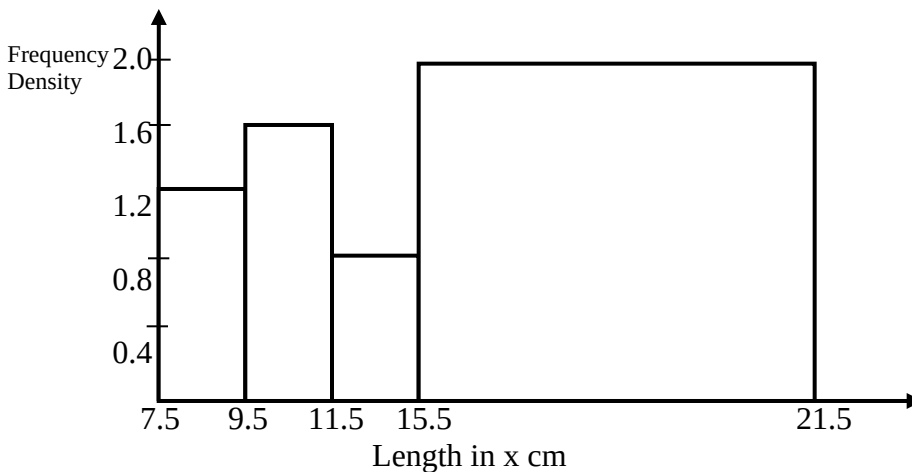
(3mks)

8. Three similar pieces of timber of length 240cm, 320cm and 380cm are cut into equal pieces. Find the largest possible area of a square which can be made from any of the three pieces. (3mks)

9. A regular polygon is such that its exterior angle is one eighth the size of interior angle.
Find the number of sides of the polygon. (3 mks)

10. Given that $\sin(2\theta + 30) = \cos(\theta - 60)$. Find the value of $\tan \theta$ to two decimal places. (2 mks)

11. The figure below shows a histogram.



Fill in the table below the missing frequencies.

(3mks)

Length in x cm	Frequency
$7.5 \leq x < 9.5$	12
$9.5 \leq x < 11.5$	
$11.5 \leq x < 15.5$	
$15.5 \leq x < 21.5$	

12. A straight line L_1 is perpendicular to another line L_2 whose equation is $3y + 4x = 12$. If the two lines meet at point P which lies on the x-axis, find:

(i) The co-ordinate of point P (1mk)

(ii) The equation of line L_1 in the form $y = mx + c$ (3mks)

13. The heights of two similar pails are 12cm and 8cm. The larger pail can hold 2 litres. What is the capacity of the smaller pail? Give your answer to 2 decimal places. (3mks)

14. Two matrices A and B are such that $A = \begin{pmatrix} k & 4 \\ 3 & 2 \end{pmatrix}$ and $B = \begin{pmatrix} 1 & 3 \\ 3 & -4 \end{pmatrix}$. Given that the determinant of AB = 10, find the value of k. (3mks)

15. 1000cm^3 of milk was shared by three children, Nick, Soita and Swalleh in the ratio $\frac{1}{4} : \frac{1}{2} : \frac{1}{5}$. What volume did Soita get? (2mks)

16. Given that $\log a = 0.30$ and $\log b = 0.48$ find the value of $\log \frac{b^2}{a}$. (2 mks)

SECTION II

Answer any five questions in this section.

17. The distance between two towns **A** and **B** is 760 km. A minibus left town **A** at 8:15a.m and traveled towards **B** at an average speed of 90km/h. A matatu left **B** at 10:35a.m and on the same day and travelled towards **A** at an average speed of 110km/h.

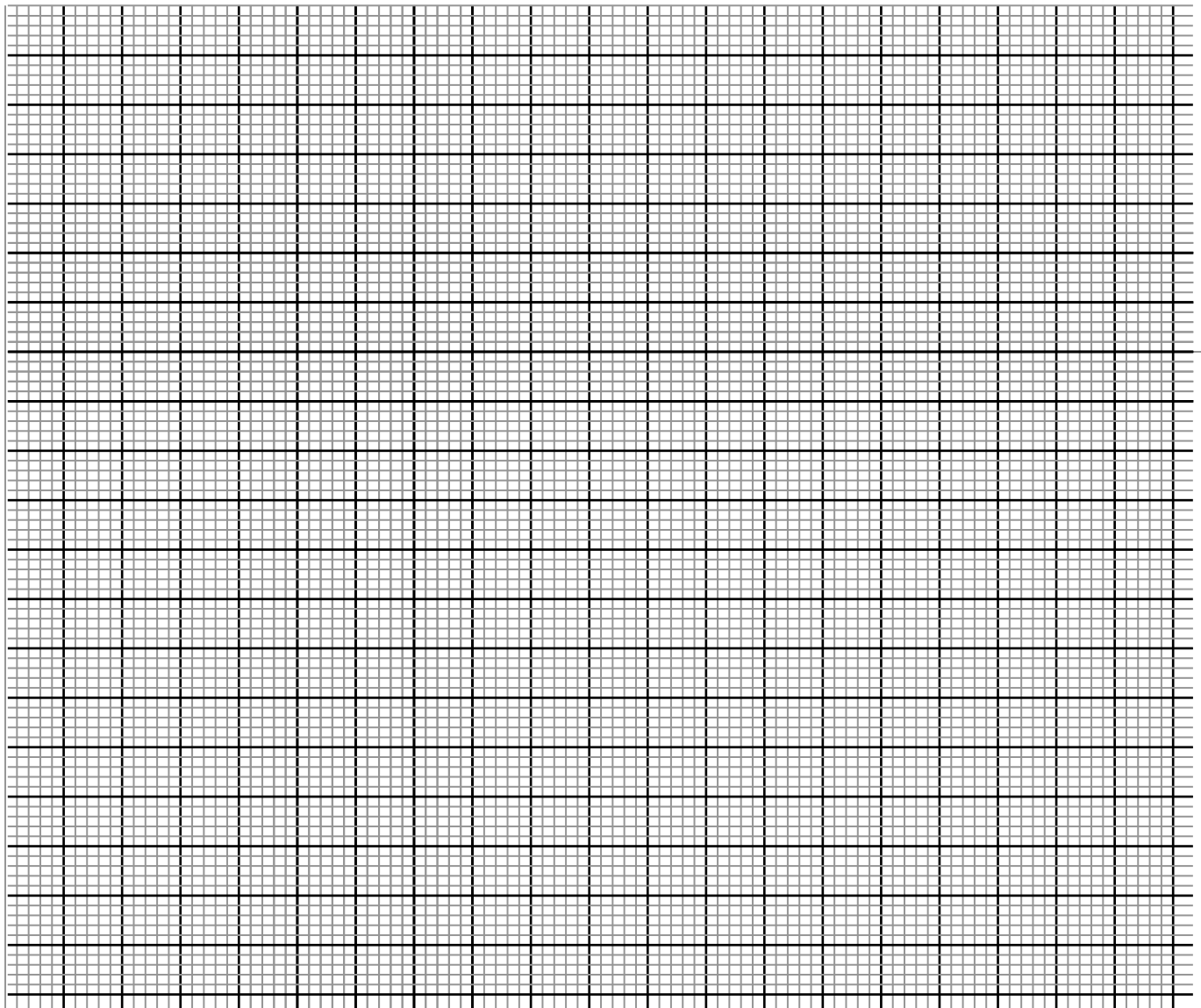
(a)(i) How far from **A** did they meet? (4mks)

(ii) At what time did they meet? (2mks)

(b) A motorist starts from his home at 10:30 a.m on the same day and traveled at an average speed of 100km/h. He arrived at **B** at the same time as the minibus. Calculate the distance from **B** to his home. (4mks)

18. The coordinates of a triangle ABC are A(1, 1) B(3, 1) and C(1, 3).

- (a) Plot the triangle ABC. (1 mark)
- (b) Triangle ABC undergoes a translation vector $\begin{pmatrix} 2 \\ 2 \end{pmatrix}$. Obtain the image of A' B' C' under the transformation, write the coordinates of A' B' C'. (2 marks)
- (c) A' B' C' undergoes a reflection along the line $X = 0$, obtain the coordinates and plot on the graph points A'' B'' C'', under the transformation (2 marks)
- (d) The triangle A'' B'' C'' , undergoes an enlargement scale factor -1, centre origin. Obtain the coordinates of the image A''' B''' C'''. (2 marks)
- (e) The triangle A''' B''' C''' undergoes a rotation centre (1, -2) angle 120° . Obtain the coordinates of the image A^{iv} B^{iv} C^{iv}. (2 marks)
- (f) Which triangles are directly congruent. (1 mark)



19. The income tax rates in a certain year are as shown below.

Income (K£ – p.a)	Rate (KSh. per £)
1 – 4200	2
4201 – 8000	3
8001 – 12600	5
12601 – 16800	6
16801 and above	7

Omar pays Sh. 4000 as P.A.Y.E per month. He has a monthly house allowance of KSh.10800 and is entitled to a personal relief of KSh. 1,100 per month. Determine:

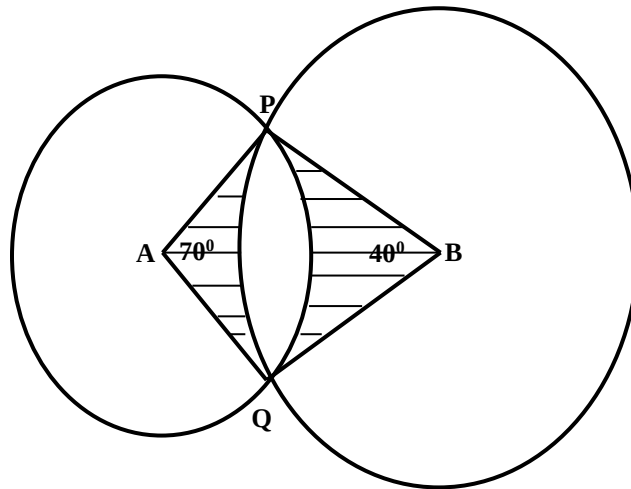
(i) his gross tax per annum in Kshs (2 Marks)

(ii) his taxable income in K£ per annum (2 marks)

(iii) his basic salary in Ksh. per month (2marks)

(iv) his net salary per month (2 marks)

20. The diagram below shows two circles, centre A and B which intersect at points P and Q. Angle PAQ = 70° , angle PBQ = 40° and PA = AQ = 8cm.



- Use the diagram to calculate
- (a) PQ to correct to 2 decimal places (2 Marks)
- (b) PB to correct to 2 decimal places (2 Marks)
- (c) Area of the minor segment of the circle whose centre is A (2 mks)
- (d) Area of the minor segment of the circle whose centre is B (2mks)
- (e) Area of the shaded region. (2mks)

21. Three Kenyan warships A, B and C are at sea such that ship B is 450km on a bearing of 030° from ship A. Ship C is 700km from ship B on a bearing of 120° . An enemy ship D is sighted 1000km due south of ship B.

- (a) Taking a scale of 1cm to represent 100km locate the position of the ships A, B, C and D.
(4 Marks)

(b) Find the compass bearing of:

(i) Ship A from ship D (1 Mark)

(ii) Ship D from ship C (1 Mark)

(c) Use the scale drawing to determine

(i) The distance of D from A (1 Mark)

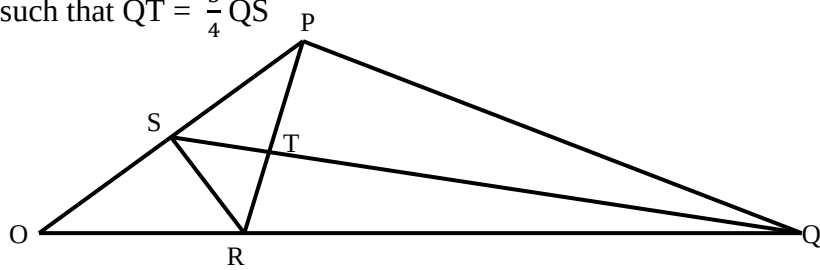
(ii) The distance of C from D (1 Mark)

(d) Find the bearing of:

(i) B from C (1 Mark)

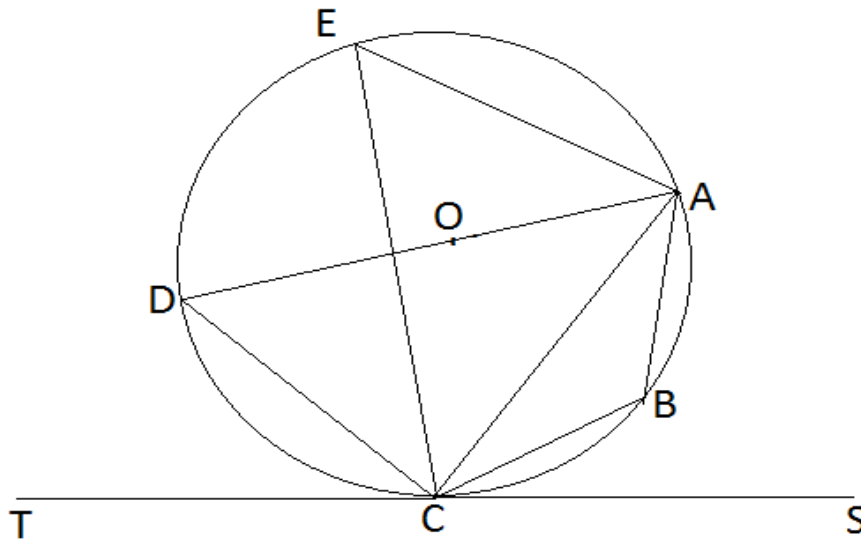
(ii) A from C (1 Mark)

22. The figure below shows triangle OPQ in which $OS = \frac{1}{3} OP$ and $OR = \frac{1}{3} OQ$. T is a point on QS such that $QT = \frac{3}{4} QS$



- (a) Given that $OP = p$ and $OQ = q$, express the following vectors in terms of p and q .
- (i) $\vec{SR}$ (1 Mark)
- (ii) $\vec{QS}$ (2 Marks)
- (iii) $\vec{PT}$ (2 Marks)
- (iv) $\vec{TR}$ (2 Marks)
- (v) show that point P, T, R are collinear. (3mks)

23. In the figure below DA is a diameter of the circle ABCDE centre O. TCS is a tangent to the circle at C, $AB = BC$ and angle $DAC = 38^\circ$



Giving reasons, determine the following angles:

(a) $\angle DCT$ (2 marks)

(b) $\angle DEA$ (2 marks)

(c) $\angle ACB$ (2 marks)

(d) $\angle BDC$ (2 marks)

(e) $\angle BOA$ (2 marks)

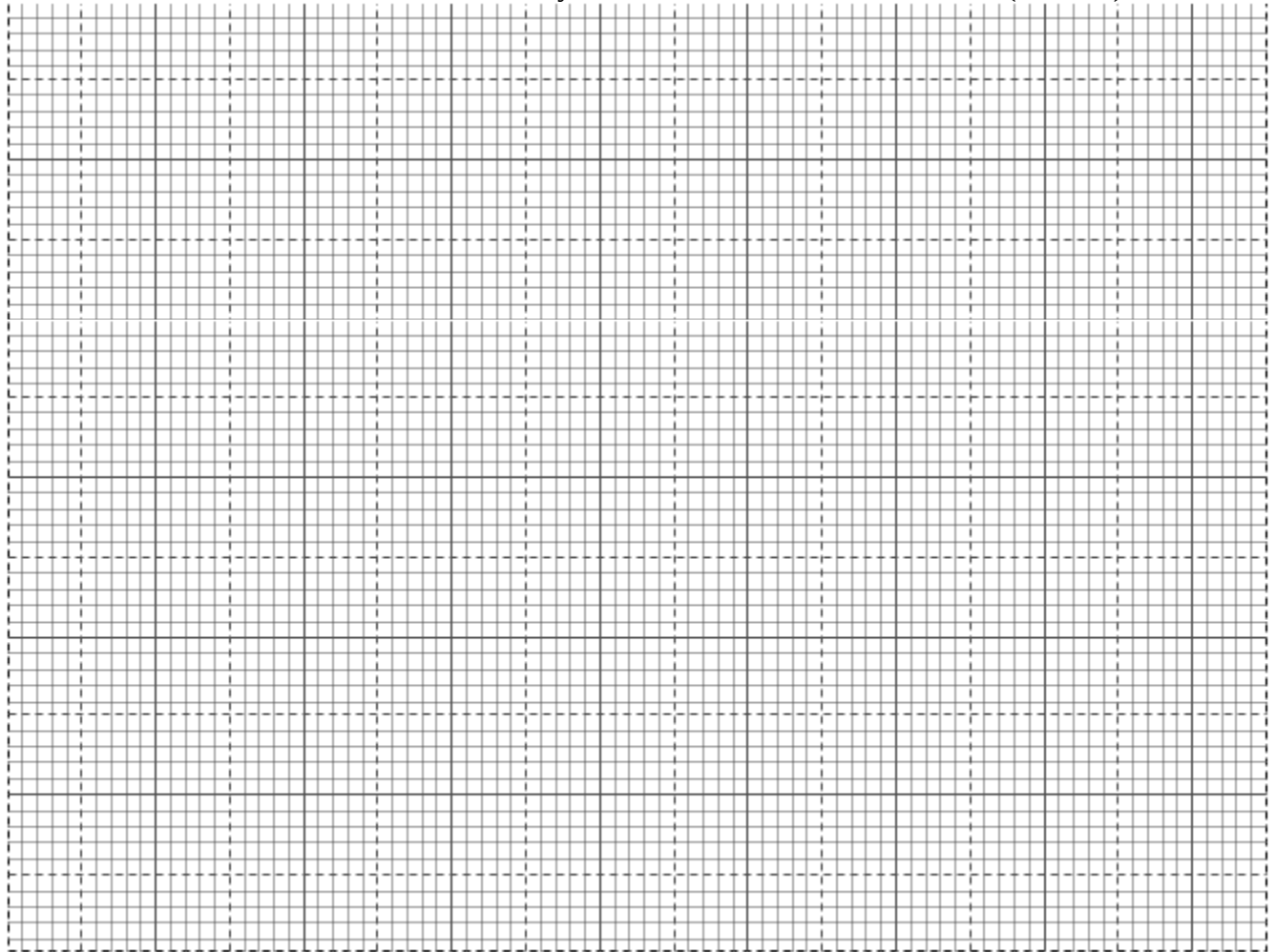
24 (a) (i) Fill the table below for the function.

$$y = 2x^2 + 5x - 12 \text{ for } -8 \leq x \leq 4$$

(2 marks)

x	-8	-7	-6	-5	-4	-3	-2	-1	0	1	2	3	4
$2x^2$	128					18				2			32
$5x$	-40					-15				5			20
-12	-12					-12				-12			-12
y	76					-9				-5			40

(ii) Using the table, draw the graph of the function $y = 2x^2 + 5x - 12$. Use the scale 1cm to 1 unit on the x-axis and 1cm for 10 units for the y – axis (4 marks)



b) Use the graph drawn above to solve the following equations.

(i) $2x^2 + 5x - 12 = 0$

(2 marks)

(ii) $3 - 7x - 3x^2 = 0$

(2 marks)