MARKING SCHEME

BSJE JOINT EXAMINATION

-2024 -

Kenya Certificate of Secondary Education

121/1 Mathematics Alt. A Paper 1

July, 2024 TIME: 2½ Hrs

Name: .... Index No: ....

School: .... Signature: ....

121/1 - Mathematics
Friday, 12TH July, 2024
Morning
8.00am-10.30am

Instructions to candidates.

(a) Write your name and index number in the spaces provided above.
(b) Sign and write the date of the examination in spaces provided above.
(c) This paper consists of two sections: Section **I** and **II**.
(d) Answer ***all*** the questions in section I and ***only five*** questions from section II.
(e) Show ***all*** the steps in your calculations, giving your answer at each stage in the space provided.
(f) Marks may be given for correct working even if the answer is wrong.
(g) Non-programmable silent electronic calculators and **KNEC** mathematical tables may be used, except where stated otherwise.
(h) ***Candidates should check the question paper to ascertain that no questions are missing.***
(i) ***Candidates should answer the questions in English.***

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

SECTION I (50MARKS): **Answerall the questions in this section in the spaces provided.**

1. Evaluate without using tables or calculators (3marks)

$$\frac{{}^{6}/_{7} \text{ of } {}^{14}/_{3} \div 80 \times {}^{-20}/_{3}}{-2 \times 5 \div (14 \div 7) \times 3}$$

Num: $\frac{6}{7} \times \frac{14}{3} = 4$

$4 \div 80 = \frac{4}{80}$

$\frac{4}{80} \cancel{\div} \frac{-20}{3} = \frac{4}{80} \times \frac{-20}{3}$

$= -\frac{1}{3}$

Deno: $-2 \times \frac{5}{2} \times 3$

$= -15$

$\frac{N}{D} = \frac{-1/3}{-15} = -\frac{1}{3} \times \frac{1}{-15}$

$\Rightarrow \frac{1}{45}$

M1 - Numerator
M1 - Denominator
A1
03

2. Solve the following inequalities and represent the solution on a number line. (3marks)

4– 3 ≤ 6x -1 < 3x + 8

$4x - 3 \leq 6x - 1$

$-2x \leq 2$

$x \geq 1$

$6x - 1 < 3x + 8$

$3x < 9$

$x < 3$

$1 \leq x < 3$

M1 - Both solution
B1 - Compound statement
B1 - Correct number line
03

3. Use tables of squares, cubes roots and reciprocals to evaluate; (4marks)

$$23.5^3 - \sqrt[3]{(4411)} + \frac{1}{0.0071}$$

$(2.35 \times 10)^3 - \sqrt[3]{4.411 \times 10^3} + \frac{1}{7.1 \times 10^{-3}}$

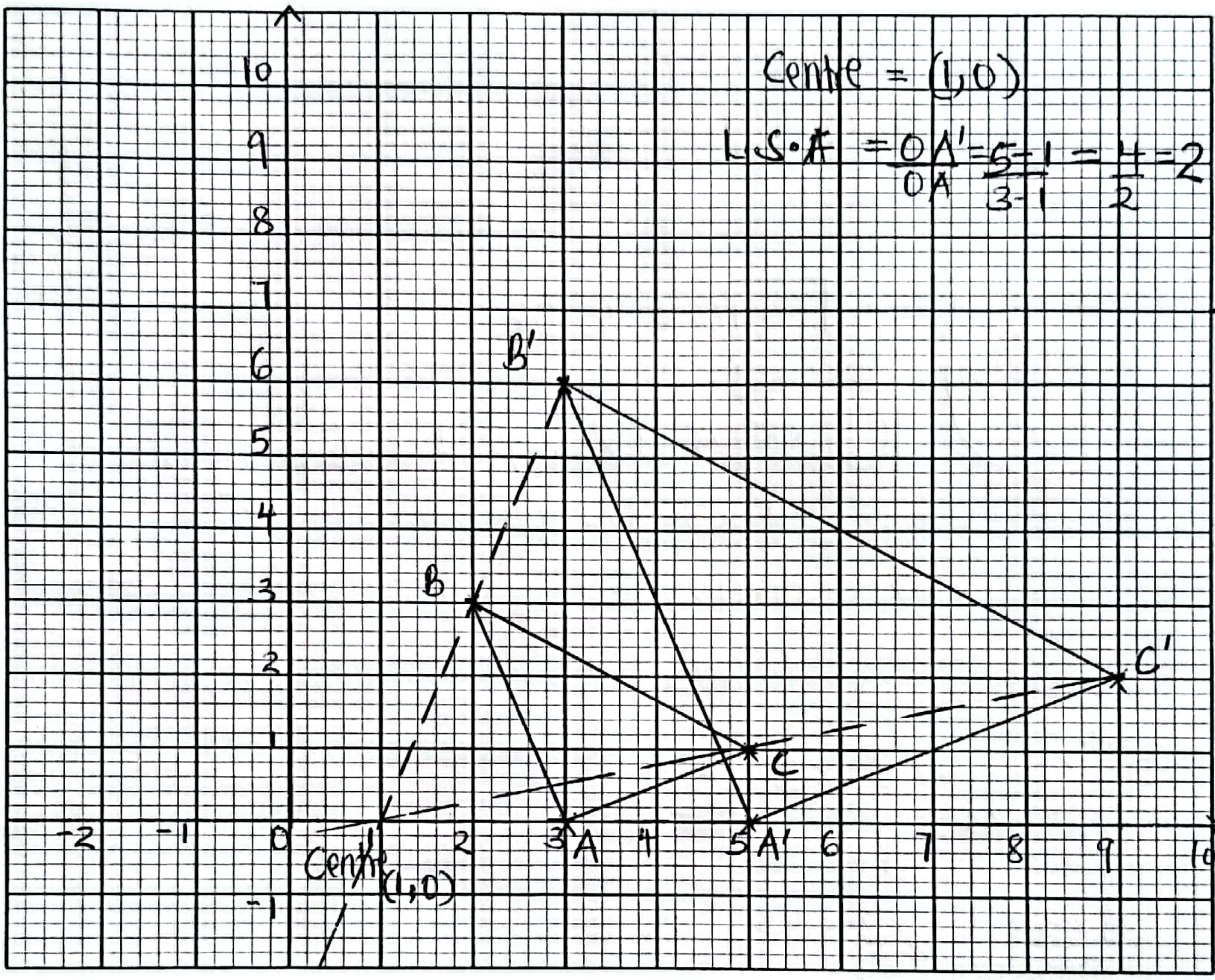
$12.978 \times 10^3 - 1.64 \times 10 + 0.1408 \times 10^3$

$12978 - 16.4 + 140.8$

$\Rightarrow 13,102.4$

M1 - All logs correct
M1 - Addition / subtraction
M1 - Multiplication
A1
04

4. Triangle ABC has its vertices at A(3, 0), B(2,3) and C(5,1) if A′(5, 0), B′(3,6) and C′(9,2) is the image of ABC under enlargement. On the same axes and grid provided below, determine the Centre of enlargement and linear scale factor. (3marks)



B1 - Both diagrams

B1 - Centre of enlarge

B1 - L.S.F

03

5. Phenny is a saleslady. She is paid Ksh 15,375 per month. She is also paid a commission of 4 ½ % on the amount of money she makes from her sales. In a certain month, she earned a total of Ksh. 28,875. Calculate the value of her sales that month. (3marks)

Commission earned = 28 875 - 15 375 = ksh. 13,500 | M1 - Commission earned.

4.5% → 13,500

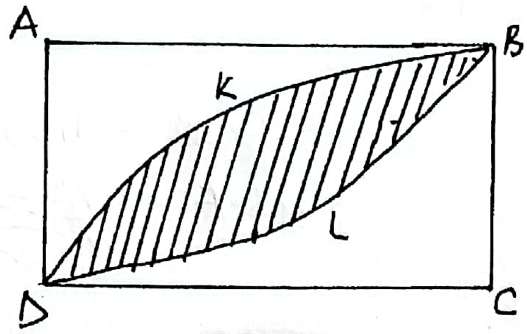
100% → ??

$\frac{100 \times 13,500}{4.5}$ | M1 - Equation

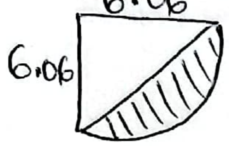
⇒ Kshs. 300,000 | A1 - Sales

03

6. The figure drawn below is a square ABCD of sides 36.75cm. The shaded area is formed out of two segments. DCB and DKB. Find the area of the shaded region. (3marks)



Length of square $= \sqrt{36.75} \simeq 6.06$



Area shaded ;

$2\left[\left(\frac{90}{360} \times \frac{22}{7} \times 6.06 \times 6.06\right) - \left(\frac{1}{2} \times 6.06^2 \sin 90\right)\right]$

$\Rightarrow 2(28.85 - 18.36)$

$\Rightarrow 20.98cm^2$

M1	Length of the square
M1	Expression / Equation
A1	Area shaded
03	

7. Solve for x in the equation: $3^{2x+1} + 4 \times 3^{2x+1} - 45 = 0$ (3 marks)

$3^{2x} \times 3^1 + 4 \times 3^{2x} \times 3^1 = 45$

Let $3^{2x} = y$

$y \times 3 + 4 \times y \times 3 = 45$

$3y + 12y = 45$

$15y = 45$

$y = 3$

$3^{2x} = 3^1$

$2x = 1$

$x = \frac{1}{2}$

M1	Expanding the equation
M1	Finding the unknown
A1	Value of X
03	

8. Simplify the expression to its simplest form $\frac{24x^2 + 2ax - 12a^2}{18x^2 - 8a^2}$ (3marks)

$N = 24x^2 + 18ax - 16ax - 12a^2$

$= 6x(4x+3a) - 4a(4x+3a)$

$\simeq (6x-4a)(4x+3a)$

$\frac{\cancel{2}(3x-\cancel{2}a)(4x+3a)}{\cancel{2}(3\cancel{x}-2a)(3x+2a)}$

$= \frac{4x+3a}{3x+2a}$

Alternatively;

$\frac{\cancel{2}(12x^2+9x-6a^2)}{\cancel{2}(9x^2-4a^2)}$

$N = 12x^2 + 9ax - 8ax - 6a^2$

$= 3x(4x+3a) - 2a(4x+3a)$

$(3x-2a)(4x+3a)$

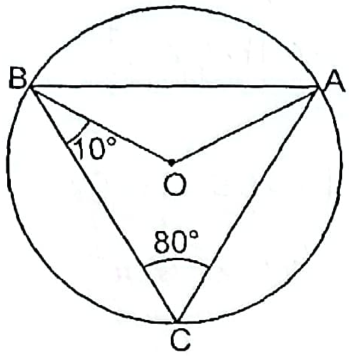
$D = (3x-2a)(3x+2a)$

$\frac{N}{D} = \frac{(\cancel{3x-2a})(4x+3a)}{(\cancel{3x-2a})(3x+2a)}$

$\Rightarrow \frac{4x+3a}{3x+2a}$

M1	Num
M1	Den
A1	Ans. simplified Fraction.
03	

9. In the figure below, O is the centre of circle. Angle BCA=80^0 and angle CBO = 10^0. Determine the size of angle CAB. (3marks)



$\angle AOB = 160^\circ$

$\angle ABC = 10^\circ$

$\therefore \angle CBA = 10^\circ + 10^\circ$

$\Rightarrow 20^\circ$

M1	For $\angle AOB = 160^\circ$
M1	For $\angle ABC = 10^\circ$
A1	$\angle CBA = 20^\circ$
03	

10. A foreign exchange bureau in Mombasa buys and sells selected foreign currencies at the rates shown in the table below.

Currency	Buying (Ksh)	Selling (Ksh)
1 South African Rand	7.48	7.95
1 Chinese Yuan	20.03	20.20

A tourist arrived in Kenya from South Africa with 7,435,000 South African Rands. She converted the whole amount to Kenya shillings through an agent at a commission of 2%. While in Kenya, she spent 25% of this money and converted the balance to Chinese Yuan. Calculate the amount of Chinese Yuan that she received. (3 marks)

$7.48 \times 7435000 = $ Ksh. 54865800

Money Received $\Rightarrow \frac{98}{100} \times 54865800$

$=$ Ksh. 53768484

Remaining Money $= \frac{75}{100} \times (53768484)$

$=$ Ksh. 40326363

Balance in Yuan; $\frac{40326363 \times 1}{20.20}$

$\Rightarrow 1,996,354.60$ Chinese Yuan

M1	Money Received
M1	75% of total Money
A1	Balance Yuan
03	

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

$AB = \begin{pmatrix} K & 4 \\ 3 & 2 \end{pmatrix} \begin{pmatrix} 1 & 2 \\ 3 & 4 \end{pmatrix} = \begin{pmatrix} K+12 & 2K+16 \\ 9 & 14 \end{pmatrix}$

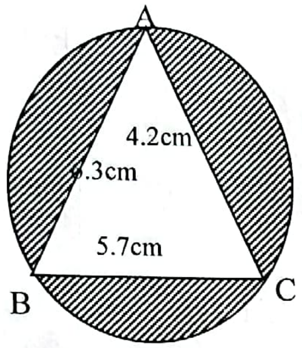
Determinant $= 14K + 168 - 18K - 144 = 4$

$-4K = 4 - 24$

$K = 5$

M1	For AB
M1	Expression / Equation of det
A1	Value of K

12. The circle below whose area is 18.05cm^2 circumscribes triangle ABC where AB = 6.3cm, BC = 5.7cm and AC = 4.2cm. Find the area of the shaded part. (4Marks)



$S = \frac{1}{2}[5.7 + 4.2 + 6.3]$

$= 8.1$

Area of triangle $= \sqrt{8.1(8.1-5.7)(8.1-4.2)(8.1-6.3)}$

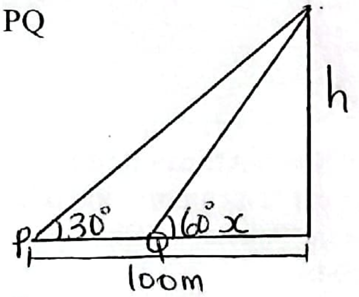
$\Rightarrow 11.68 cm^2$

Area shaded $\Rightarrow 18.05 - 11.68$

$= 6.368 cm^2$

B1	for s (8.1)
M1	Expression of area
M1	For 11.682 or 11.68
A1	Shaded Area.
04	

13. A boat is at point P, a distance of 100km from the bottom of a hill. The angle of elevation of the top of the hill is 30° from P. The boat sails straight towards the hill to a point Q from where the angle of elevation to the top of the hill is now 60°. Calculate the distance PQ (3 marks)



$\tan 30 = \frac{h}{100}$

$h \Rightarrow 100 \tan 30° = 57.735$

$\tan 60 = \frac{57.735}{x}$

$x = \frac{57.735}{\tan 60}$

$\Rightarrow 33.33km$

$PQ = 100 - 33.33$

$\Rightarrow 66.67km$

M1	For h the height of the Hill
M1	For the equation/Expression
A1	Distance PQ
03	

14. The interior angle of a regular polygon is 108^0 larger than the exterior angle. Determine the number of sides of the polygon. (3 Marks)

Interior + Exterior $= 180°$

$x + x - 108 = 180°$

$2x = 288$

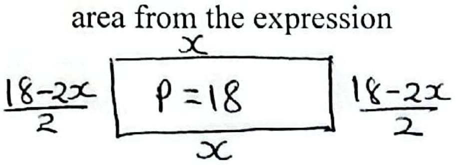
$x = 144$

Exterior $= 36°$

No. of sides $= \frac{360°}{36} \Rightarrow 10$ sides

M1	For equation
M1	Exterior angle
A1	No. of sides
03	

15. A piece of wire 18 cm long is to be bent to form a rectangle. If its length is x cm, obtain an expression for its area. Hence calculate the dimensions of the rectangle with maximum area from the expression (3marks)



Width $= \frac{18-2x}{2} = 9-x$

Area $=$ L x W

$= x(9-x)$

$= 9x - x^2$

For maximum area;

$\frac{dA}{dx} = 9 - 2x = 0$

$2x = 9$

$x = 4.5$

$\therefore$ Length $= 4.5$cm

Width $= 4.5$cm

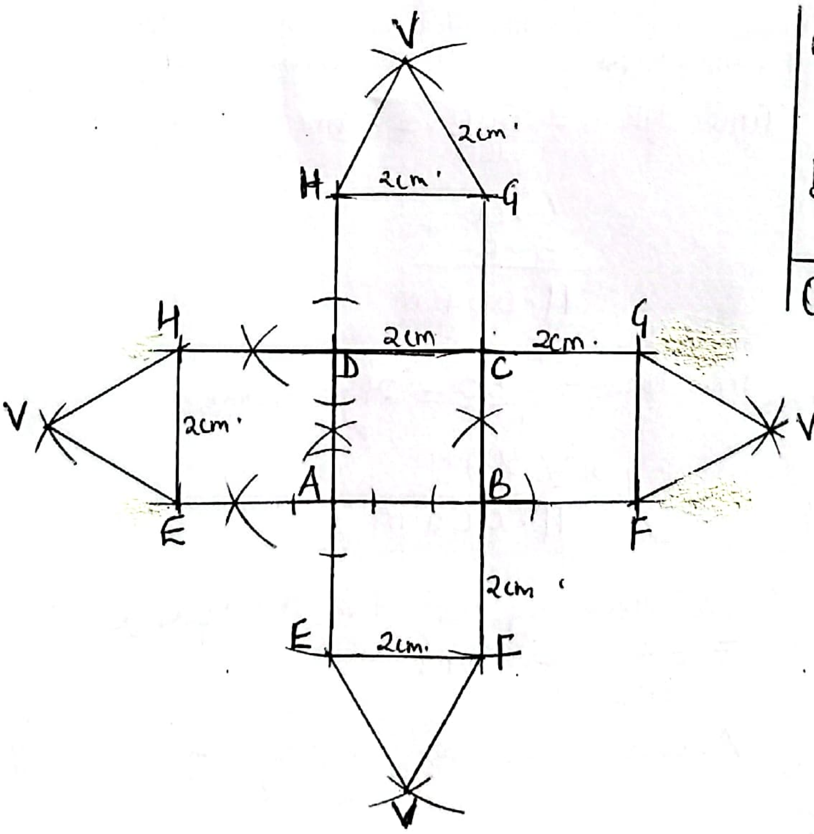
M1 — For expression of the width.

B1 — Expression for the area

A1 — Dimensions.

03

16. A solid comprises of a cube **ABCDEFGH** of each side **2cm** and a square based pyramid **EFGHV**. The slant edges of the pyramid **EV=FV=GV=HV=2cm**. Draw the net of the solid. (3marks)



B1 B1 — well drawn diagram

B1 — well labelled

03

SECTION II(50 Marks)

*Answer only **five** questions from this section in the spaces provided*

17. A bus left Kisumu at 6.00a.m and travelled towards Usenge Boys at an average speed of 100km/hr. At 6.30 am, a van left Usenge Boys and travelled towards Kisumu to receive the bus with a number of students moving at an average speed of 125km/h.Given that the distance between Kisumu and Usenge Boys is 500km Calculate:

a. The time the two vehicles met. (4marks)

Distance covered by Bus;

$\frac{1}{2} \times 100 = 50km$

Time taken to meet

$\frac{x}{100} = \frac{450-x}{125}$

$125x = 45000 - 100x$

$225x = 45{,}000$

$x = 200km.$

Time taken $= \frac{200}{100} = 2hrs$

Alternatively;

Distance travelled by Bus;

$\frac{1}{2} \times 100 = 50km$

$R.D = 500km - 50km = 450km$

$R.S = 125km/h + 100km/h = 225km/h.$

$R.T = \frac{450km}{225km/h} = 2hrs$

Time they met ⇒ 6.30 + 2.00

= 8.30a.m.

M1	Distance covered by bus
M1	Equation for time taken (R.T)
M1	Equation at Addition.
A1	Meeting time
04	

b. On meeting, the bus proceeded with its journey but the van had a break of 30 minutes before proceeding for Usenge Boys. Calculate:

i. The time the bus arrived at Usenge Boys. (3marks)

Time taken $= \frac{500}{100} = 5hrs$

6.00 + 5.00

11.00a.m

OR

Time taken $= \frac{250}{100} = 2hrs\ 30min$

8.30a.m + 2.30

11.00a.m

M1	total time taken
M1	Addition
A1	Arrival time
03	

ii. The time the van arrived at Usenge Boys (3marks)

Time taken by the Van to Usenge

$= \frac{250}{125} = 2hrs$

Arrival time ⇒ 8.30a.m + 2.00 + 30

11.00a.m.

M1	Time taken
M1	Addition
A1	Arrival time
03	

18. Complete the table below for the function y= $x^2 - 3x + 6$ in the range $-2 \le x \le 8$. (2mks)

X	-2	-1	0	1	2	3	4	5	6	7	8
Y	16	10	6	4	4	6	10	16	24	34	46

B2

02

a. Use the trapezium rule with 10 strips to estimate the area bounded by the curve, $y=x^2 - 3x + 6$, the lines $x = -2$, $x = 8$ and the x – axis. (3mks)

Height $= \frac{8^- - 2}{10} = 1$ M1 - Height

Area $= \frac{1}{2} \times 1 [(16+46) + 2(10+6+4+4+6+10+16+24+34)]$ M1 - Expression

$= 0.5[62 + 228]$

$\Rightarrow 145$ Square units. A1 Area

03

b. Use the mid – ordinate rule with 5 strips to estimate the area bounded by the curve, $y = x^2 - 3x + 6$, the lines $x = -2$, $x = 8$ and the x- axis. (2mks)

Height $= \frac{8^- - 2}{5} = 2$ M1 - Expression

$A = 2(10 + 4 + 6 + 16 + 34)$ A1 - Area.

$\Rightarrow 140$ square units.

02

c. By integration, determine the actual area bounded by the curve $y = x^2 - 3x + 6$, the lines $x = -2$, $x = 8$, and the x – axis. (3mks)

$\int_{-2}^{8} (x^2 - 3x + 6)\,dx$ M1 M1 - Integrate

$\left[\frac{x^3}{3} - \frac{3x^2}{2} + 6x\right]_{-2}^{8}$ M1 - substitute

$\left[\frac{8^3}{3} - \frac{3(8)^2}{2} + 6(8)\right] - \left[\frac{(-2)^3}{3} - \frac{3(-2)^2}{2} + 6(-2)\right]$ A1 - Area

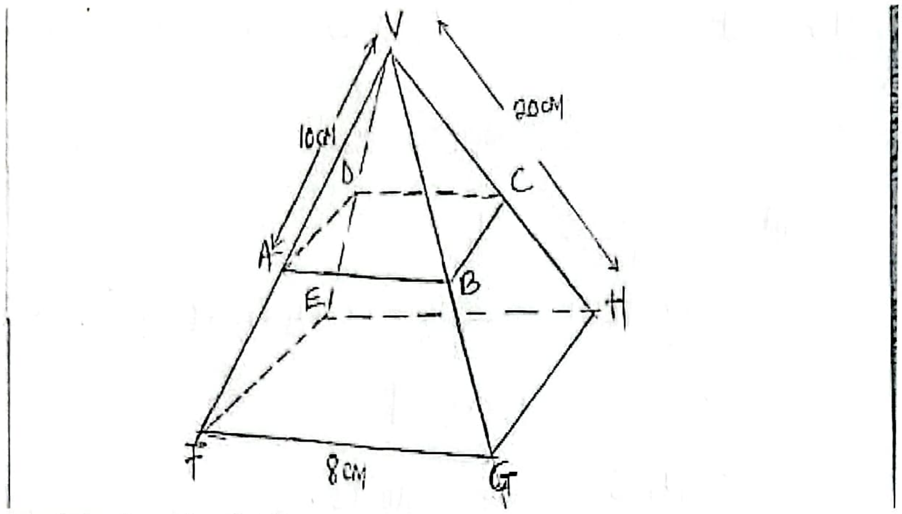
$= (170\tfrac{2}{3} - 96 + 48) - (4 - 6 - 12)$

$= 122\tfrac{2}{3} - - 22$

$\Rightarrow 144\tfrac{2}{3}$

03

19. The figure below is a right pyramid VEFGH with a square base of 8cm and a slant edge of 20cm. points A,B,C and D lie and plane ABCD is parallel to the base EFGH.



a. Find the length of AB. (2marks)

$$\frac{20}{10} = \frac{8}{x}$$

$$20x = 80$$

$$x = 4\text{cm}.$$

M1 - Expression

A1 - C.A.O

02

b. Calculate to 2 decimal places.

i. The length of AC. (2marks)

$$AC = \sqrt{4^2 + 4^2} = \sqrt{32}$$

$$\Rightarrow 5.66\text{cm}$$

M1 - Expression

A1 - C.A.O

02

ii. The perpendicular height of the pyramid VABCD. (2marks)

$$h = \sqrt{10^2 - 2.83}$$

$$= 9.59\text{cm}$$

M1 - Expression

A1 - C.A.O

02

c. The pyramid VABCD was cut off. Find the volume of the frustrum ABCDEFGH correct to 2 decimal places. (4marks)

$$\frac{4}{2} = \frac{x + 9.59}{9.59}$$

$$2x + 19.18 = 38.36$$

$$2x = 19.18$$

$$x = 9.59$$

$$H = 9.59 + 9.59$$

$$= 18.18\text{cm}$$

Volume of Frustum ABCDEFGH

$$= \frac{1}{3}(8 \times 8 \times 18.18) - \left(\frac{1}{3} \times 4 \times 4 \times 9.59\right)$$

$$= 387.84 - 51.15$$

$$\Rightarrow 336.69\text{cm}^3$$

M1 Height of Pyramid

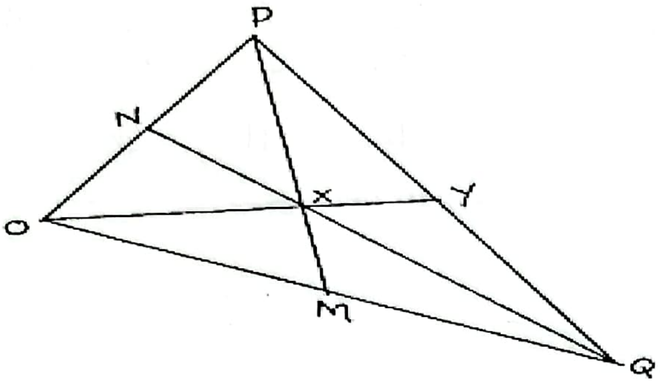
M1 Volume of Pyramid

M1 subtraction

A1 Volume of Frustum

04

20. The figure below is triangle OPQ in which **OP** = **p** and **OQ** = **q** . M and N are points on **OQ** and **OP** respectively such that **ON** = **NP** = 1:2 and **OM: MQ** = 3: 2.



(a) Express the following vectors in terms of p and q.

(i) PM. (2marks)

$PM = PO + OM$
$= -\underset{\sim}{p} + \frac{3}{5}\underset{\sim}{q}$
$= \frac{3}{5}\underset{\sim}{q} - \underset{\sim}{p}$

B1
B1

(ii) QN. (1marks)

$QN = QO + ON$
$= -\underset{\sim}{q} + \frac{1}{3}\underset{\sim}{p}$ or
$= \frac{1}{3}\underset{\sim}{p} - \underset{\sim}{q}$.

B1

(iii) PQ. (1marks)

$PQ = PO + OQ$
$= -\underset{\sim}{p} + \underset{\sim}{q}$ or
$= \underset{\sim}{q} - \underset{\sim}{p}$.

B1

(b) Lines PN and QN intersect at X such that **PX** = **rPM** and **QX** = **tQN**. Express **OX** in two different ways and find the value of **r** and **t.** (4 marks)

$PX = \frac{3}{5}r\underset{\sim}{q} - r\underset{\sim}{p}$

$OX = OP + PX$
$= \underset{\sim}{p} + \frac{3}{5}r\underset{\sim}{q} - r\underset{\sim}{p}$
$(1-r)\underset{\sim}{p} + \frac{3}{5}r\underset{\sim}{q}$ ---(i)

$OX = OQ + QX$
$= \underset{\sim}{q} + \frac{t}{3}\underset{\sim}{p} - t\underset{\sim}{q}$.
$(1-t)\underset{\sim}{q} + \frac{1}{3}t\underset{\sim}{p}$ --(ii)

$(1-r)\underset{\sim}{p} + \frac{3}{5}r\underset{\sim}{q} = (1-t)\underset{\sim}{q} + \frac{t}{3}\underset{\sim}{p}$.

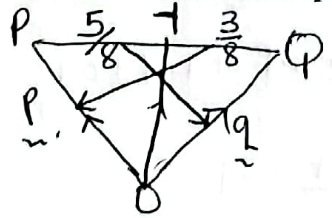
$t = 3 - 3r$ | $3r = 5 - 5t$

$3r = 5 - 5(3-3r)$
$3r = 5 - 15 + 15r$
$-12r = -10$
$r = \frac{5}{6}$

$t = 3 - 3\left(\frac{5}{6}\right)$
$t = \frac{1}{2}$
$\therefore t = \frac{1}{2}$
$r = \frac{5}{6}$

B1
B1
M1
A1

(c) **OX** produced meets **PQ** at **Y** such that **PY: YQ** = **5: 3.** Using the ratio theorem or otherwise, find **OY** in terms of **p** and **q.** (2 mark)



$OY = \frac{3}{8}\underset{\sim}{p} + \frac{5}{8}\underset{\sim}{q}$

Alternatively.

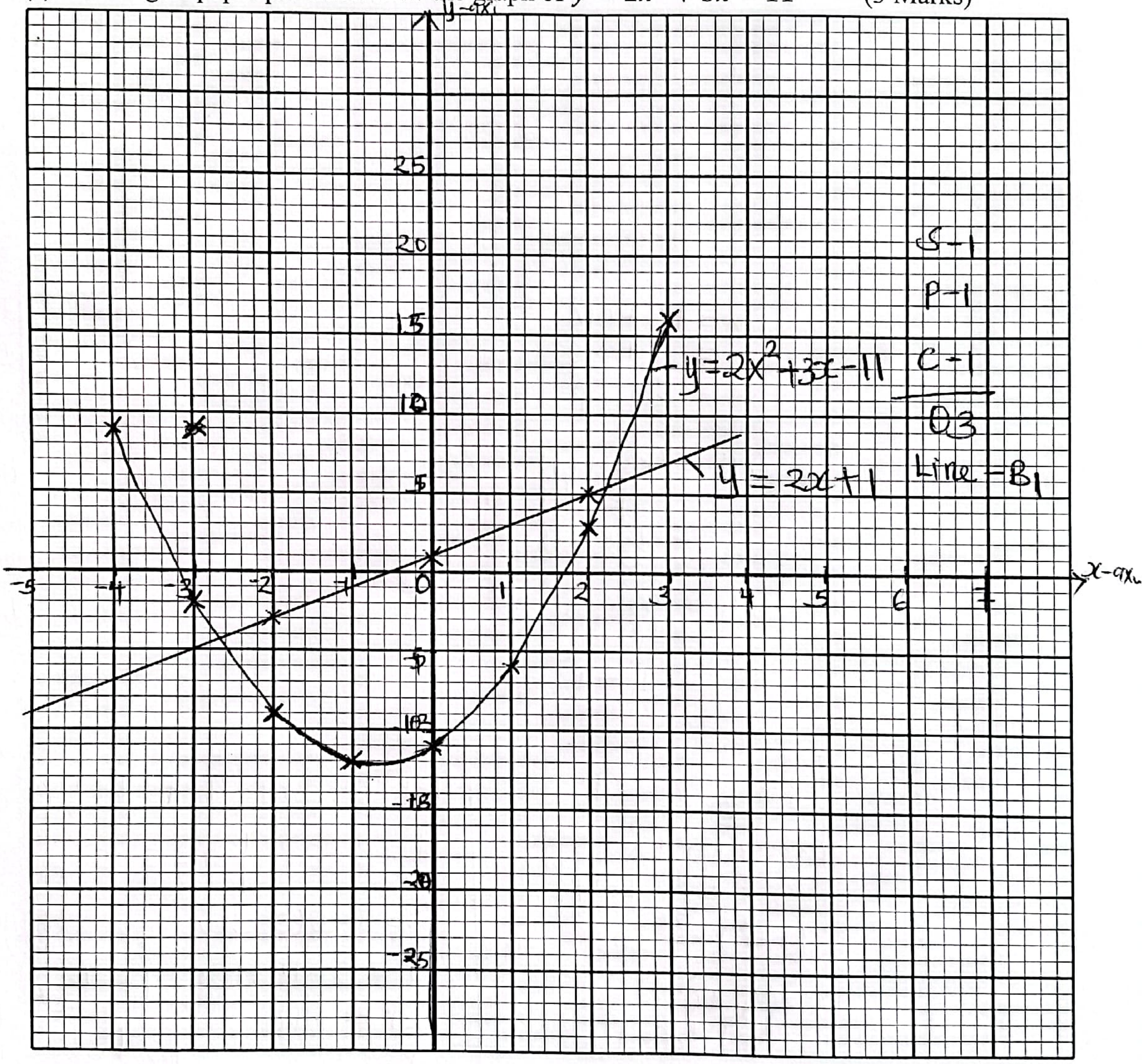
$OY = OP + PY$
$= \underset{\sim}{p} + \frac{5}{8}(\underset{\sim}{q} - \underset{\sim}{p}) = \frac{3}{8}\underset{\sim}{p} + \frac{5}{8}\underset{\sim}{q}$

B1
B1

21. Complete the table below for the equation $y = 2x^2 + 3x - 11$ (2 Marks)

x	-4	-3	-2	-1	0	1	2	3
$2x^2$	32	18	8	2	0	2	8	18
$3x$	-12	-9	-6	-3	0	3	6	9
-11	-11	-11	-11	-11	-11	-11	-11	-11
y	9	-2	-9	-12	-11	-6	3	16

(a) On the grid paper provided draw the graph of $y = 2x^2 + 3x - 11$ (3 Marks)



(b) On the same axes draw the graph of $y = 2x + 1$ (2 Marks)

X	0	2	-2
y	1	5	-3

B1

(c) Use your graph to solve the quadratic

(i) $2x^2 + 3x - 11 = 0$ (1 Mark)

$2x^2 + 3x - 11 = y$
$0 = y$

$y = 0$

$x = -3.2 \pm 0.1$ or 1.7 ± 0.1

(ii) $2x^2 + x - 12 = 0$ (2 Marks)

$y = 2x^2 + 3x - 11$
$0 = 2x^2 + x - 12$
$y = 2x + 1$

$X = -2.6 \pm 0.1$
or
2.3 ± 0.1

22. A straight line**L**1 passes through the points (8, -2) and (4,-4).

(a) Write its equation in the form ax + by +c = 0, where a, b and c are integers. (3Marks)

$G = \frac{-4-(-2)}{4-8} = \frac{-2}{-4} = \frac{1}{2}$ — M1 Gradient.

$\frac{y+2}{x-8} = \frac{1}{2}$ — M1 Expression equated to Gradient

$2y+4 = x-8$

$-x+2y+12=0$ — A1 Correct form

or

$x-2y-12=0$

03

(b) If the line **L**1 above cuts the x-axis at point P, determine the coordinates of P. (2Marks)

at x-axis; $y=0$

$-x+12=0$ — M1 Expression

$x = 12$

Coordinates of P $(12,0)$ — A1 Coordinates

02

(c) Another line**L2**, which is a perpendicular bisector to the line in (a) above cuts the y axis at the point Q. Determine the coordinates of point Q. (3 Marks)

G of $L_2 = -2$

Coordinates of point of intersection $= x = \left(\frac{8+4}{2}\right),\ y = \left(\frac{-4+-2}{2}\right) = (6,-3)$ — B1 Coordinate of intersection

Equation of $L_2 = \frac{y+3}{x-6} = \frac{-2}{1}$ — M1 Expression equated to gradient.

$y = -2x+9$

at y-intercept; $x=0$ $\therefore$ $y = 9$, $Q = (0,9)$ — A1 Q (coordinate)

03

(d) Find the length of QP (2 Marks)

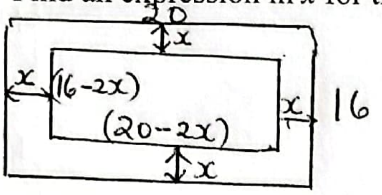
Length QP $\Rightarrow \begin{pmatrix}12\\0\end{pmatrix} - \begin{pmatrix}0\\9\end{pmatrix} = \begin{pmatrix}12\\-9\end{pmatrix}$

$\sqrt{(12)^2+(-9)^2}$ — M1 $\sqrt{12^2+(-9)^2}$

$\Rightarrow 15$ units. — A1 C.A.O

23. A rectangular field measures 20 metres by 16 metres. A path of uniform width x - metres is made all round it. This make the area of the field to reduce in the ratio 7 : 16.

a) Find an expression in x for the new length and the width (1mark)



New length $= 20-2x$

New width $= 16-2x$.

B1 — For Both.

01

b) Find the expression in x for the new area. (1mark)

New area expression; $(20-2x)(16-2x)$

$= 4x^2 - 72x + 320$

$\Rightarrow 320 - 72x + 4x^2$

B1 Expression.

01

c) Find the possible value of x (4 marks)

$$\frac{20\times16}{4x^2-72x+320} = \frac{16}{7}$$

$16(4x^2-72x+320) = 20\times16\times7$

$4x^2-18x+80 = \cancel{20}5\times7$

$x^2-18x+80 = 35$

$x^2-18x+45 = 0$

$x^2-3x-15x+45=0$

$x(x-3)-15(x-3)=0$

$(x-15)(x-3) = 0$

$x = 15$ or 3

Ignoring 15 $\therefore x = 3$ m

M1 Original expression involving ratios

M1 Simplified expression $x^2-18x+45=0$

M1 Factorized expression

A1 — C.A.O (3m)

04

d) The remaining area of the field is divided among three siblings Abdi, Bor and Celine such that the ratio of Abdi to Bor's is 3 : 4 while that of Bor's to Celine's is 6 : 5. Find the difference between the area of Celine's share and Abdi's share. (4marks)

Remaining area $= (20-6)(16-6) = 160\,m^2$

$A : B = (3:4)6 \Rightarrow 18 : 24$

$B : C = (6:5)4 \quad 24 : 20$

A : B : C

18 : 24 : 20

9 : 12 : 10

Celine's $\Rightarrow \left(\frac{10}{31}\times160\right) = 51.62\,m^2$

Abdi's $\Rightarrow \left(\frac{9}{31}\times160\right) = 46.45\,m^2$

Difference $= 51.62 - 46.45 \Rightarrow 5.17\,m^2$

M1 — For expression leading to 160m

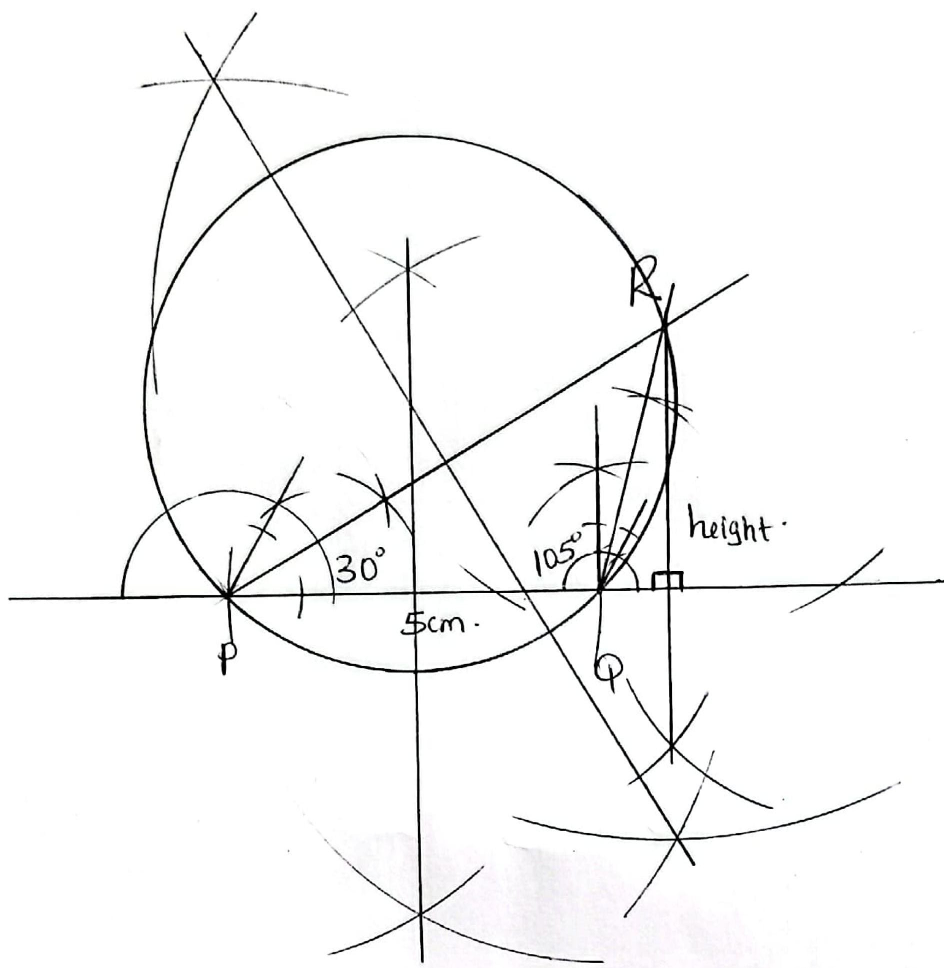
M1 — Ratio A:B:C

M1 — subtraction

A1 — Difference in area

24. Using a pair of compass and ruler only construct.

(a) Triangle PQR in which PQ =5cm$\angle$QPR = 30^0 and $\angle$PQR=105^0. (3marks)



B1	Construction of 30°
B1	105° constructed
B1	Complete triangle PQR
03	
B1	Bisector of lines
B1	Complete circle
B1	Radius measure
03	
B1	Dropping h
B1	Height of triangle
02	

(b) A circle that passes through the vertices of the triangle PQR. Measure its radius. (3marks)

Radius = 3.5 ± 0.1 cm.

(c) The height of triangles PQR with PQ as the base. Measure the height. (2marks)

Height = 3.4 ± 0.1 cm.

(d) Determine the area of the circle that lies outsides the triangle correct to 2 decimal places (2marks)

Area of the circle outside the $\triangle PQR$

$\left(\frac{22}{7} \times 3.5 \times 3.5\right) - \left(\frac{1}{2} \times 3.4 \times 5\right)$

$= 38.5 - 8.5$

$= 30 \text{cm}^2$

M1	Equation of the two areas
A1	Area outside the triangle