



MARANDA HIGH SCHOOL

Kenya Certificate of Secondary Education

THE MOCK EXAMINATIONS, 2026

121/2 MATHEMATICS

PAPER 2

June 2026

Time: 2½ Hours

Name: Admission No:

Stream: Signature:

Instructions to Candidates

- Write your name, admission number and class in the spaces provided above.
- Sign and write the date of 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 any **five** questions from **Section II**
- Show **all** the steps in your calculations, giving your answers at each stage in the spaces provided 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.
- This paper consists of **18** printed pages.
- Candidates should check the question paper to ascertain that all the pages are printed as indicated and that no questions are missing

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 I (50 marks)

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

1. Without using mathematical tables or calculator, evaluate : $\frac{\log 128 - \log 18}{\log 16 - \log 6}$ (3 marks)

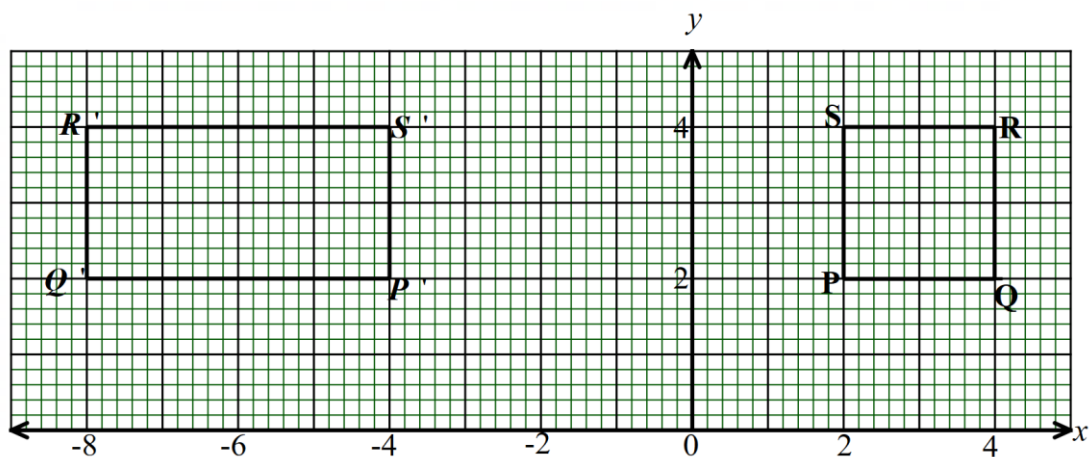
2. Solve the simultaneous equation $\begin{matrix} 2x - y = 3 \\ x^2 - xy = -4 \end{matrix}$ (4 marks)

3. Given that $\overrightarrow{OA} = \begin{pmatrix} 4 \\ 1 \\ 0 \end{pmatrix}$ and $\overrightarrow{OB} = \begin{pmatrix} x \\ y \\ z \end{pmatrix}$. Point $Q(-1, -4, 5)$ divides $\overrightarrow{AB}$ externally in the ratio 5 : 2.

Find the coordinates of B. (3 marks)

4. Four quantities W, X, Y and Z are such that W varies directly as the square root of X and inversely as the square of the sum of Y and Z. Quantity X is decreased by 36% while quantities Y and Z are each increased by 26%. Find the corresponding percentage change in W correct to 2 decimal places. (4 marks)

5. The graph below shows an object $P(2,2)$, $Q(4,2)$, $R(4,4)$ and $S(2,4)$ and its image $P'(-4,2)$, $Q'(-8,2)$, $R'(-8,4)$, and $S'(-4,4)$ under a transformation

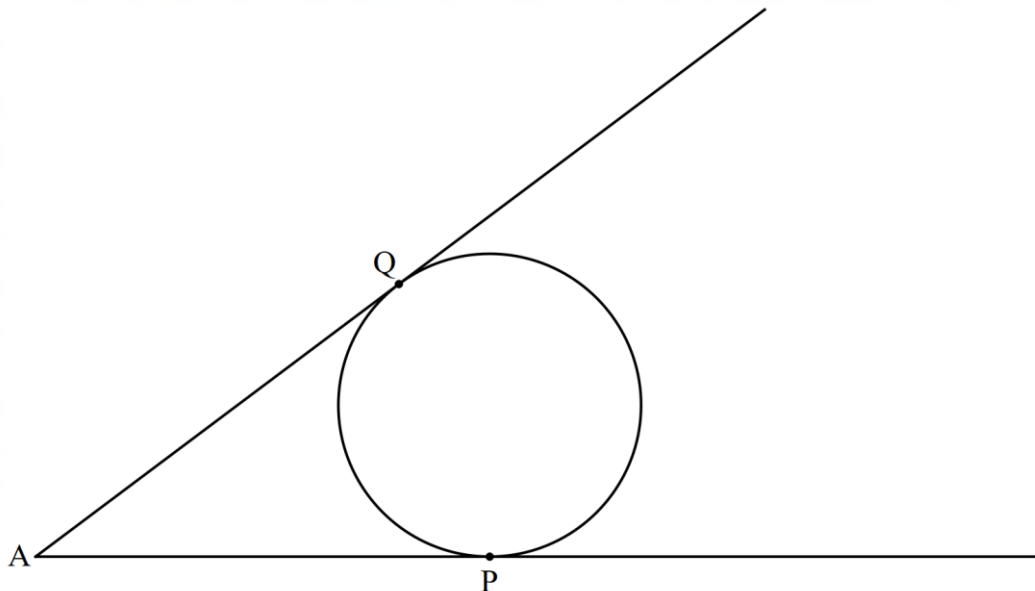


Describe fully a single transformation that maps $PQRS$ onto $P'Q'R'S'$ (3 marks)

6. In the expansion $\left(\frac{x}{c} - \frac{2}{x^3}\right)^8$ the constant term is $\frac{7}{256}$. Find the value of c . (3 marks)

7. The shoes size of five athletes in a team are 7, 3, y , 5, 9.
Given that the variance of the shoe sizes is 8, determine the possible values of y . (3 marks)

8. The figure below shows a circle. Lines AP and AQ are tangents to the circle at points P and Q respectively.

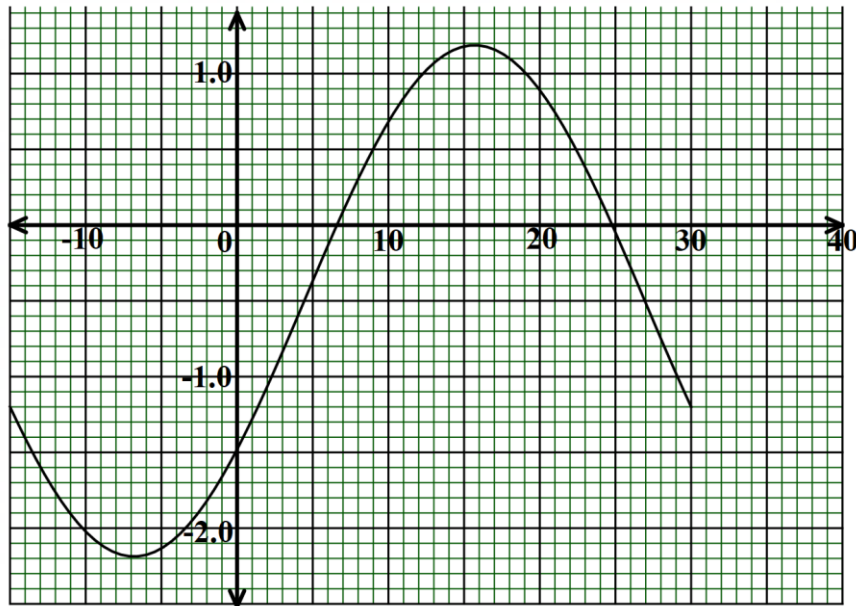


The circle is inscribed in triangle ABC. Point B lies on AP produced and $\angle ABC = 90^\circ$.

Use a ruler and a pair of compasses only to:

- Locate point O, the centre of the circle. (2 marks)
- Complete triangle ABC. (2 marks)

9. The graph below shows a trigonometric function $y = -0.5 + B \sin c x$ for the range $-15^\circ \leq x \leq 30^\circ$.



Determine the values of B and c .

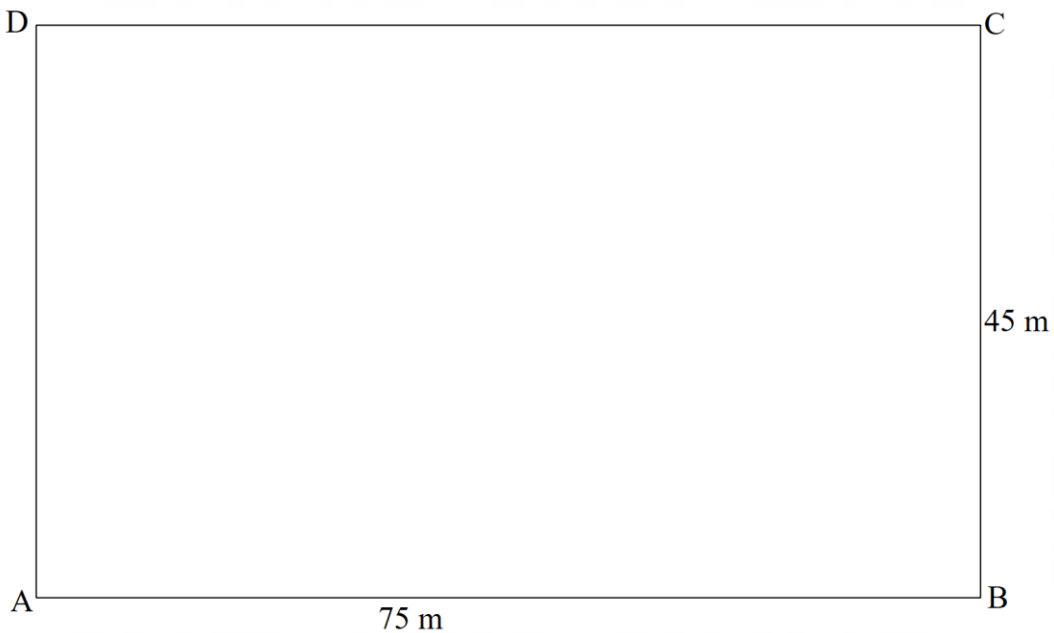
(3 marks)

10. A particle moves in a straight line from a fixed point. The velocity $v \text{ ms}^{-1}$ of the particle after t seconds is given by $v = t^2 - 4t + 3$.

Calculate the distance travelled by the particle in the first 3 seconds.

(3 marks)

11. The figure ABCD below is a scale drawing representing a rectangular garden of length 75 m and width 45 m



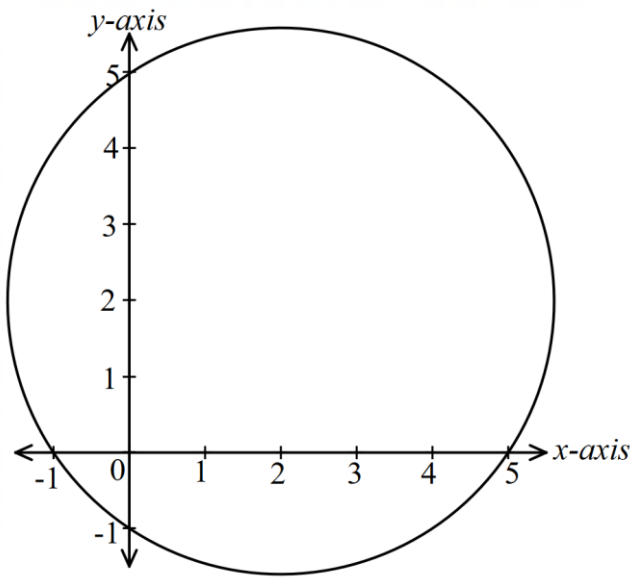
The owner wants to plant flowers inside the garden. Each flower, F, must be at least 33 m from the edge AB. In addition, angle AFB must be acute.

Shade and label region F within which the flowers may be planted (3 marks)

12. Tap A takes one hour to fill a tank with water. If tap B takes y hours to remove the same water and both taps take $1\frac{1}{2}$ hours to fill the tank, find the value of y . (3 marks)

13. A car valued at Ksh 6 000 000 depreciates by 15% in the first year and 10% in the subsequent years. Find the value of the car at the beginning of the fourth year. (2 marks)

14. The figure below shows a circle which passes through the points $(-1, 0)$, $(0, -1)$, $(5, 0)$ and $(0, 5)$



Determine :

- (a) the centre and radius of the circle (2 marks)
- (b) the equation of the circle in the form $x^2 + y^2 + ax + by + c = 0$ where a , b and c are integers (2 marks)

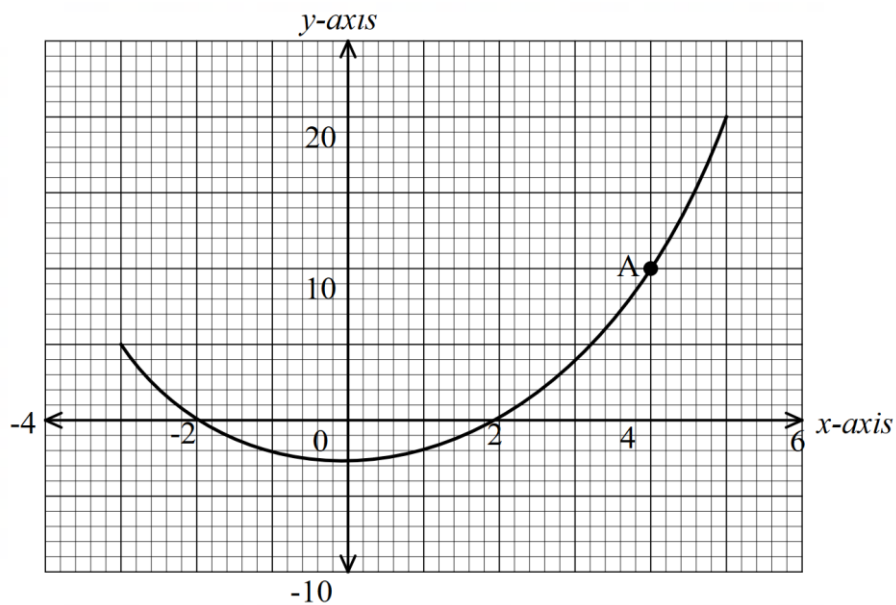
15. The life expectancy in hours of 40 bulbs are shown in the table below.

Expectancy (hours)	90–94	95–99	100–104	105–109	110–114	115–119
Frequency (f)	3	10	12	9	4	2

Calculate the quartile deviation of the life expectancy

(4 marks)

16. The figure below shows part of the a curve which passes through point A (4,10)



Determine the instantaneous rate of change at A.

(3 marks)

SECTION II (50 marks)

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

17. Given that $1+p$, $1+3p$ and $1+4p$ are the first three terms of a decreasing Geometric Progression.

Determine:

a) The value of p (3 marks)

b) The common ratio and the first term (3 marks)

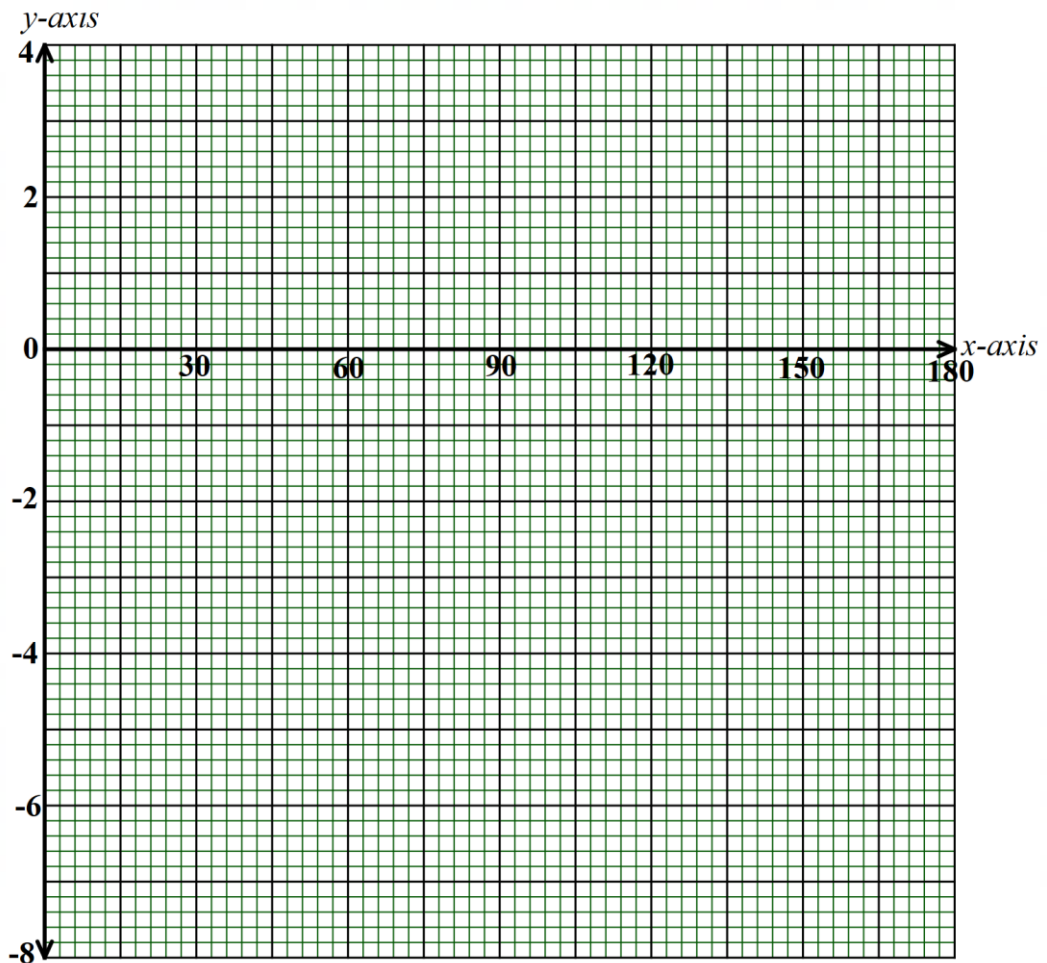
c) The greatest number of terms that will give a sum less than 1.575 (4 marks)

18. a) Complete the table below for the functions $y = \frac{9}{2} \cos(2x)^0 - \frac{5}{2}$ and $y = 3 \sin\left(\frac{7}{3}x\right)^0$ to 1 d.p.
for the range $0^\circ \leq x \leq 165^\circ$ (2 marks)

x^0	0	15	30	45	60	75
$y = \frac{9}{2} \cos(2x)^0 - \frac{5}{2}$	2.0	1.4		-2.5		
$y = 3 \sin\left(\frac{7}{3}x\right)^0$	0	1.7			1.9	

x^0	90	105	120	135	150	165
$y = \frac{9}{2} \cos(2x)^0 - \frac{5}{2}$	-7.0			-2.5		1.4
$y = 3 \sin\left(\frac{7}{3}x\right)^0$		-2.7	-2.9			1.3

- b) Draw the graphs of $y = \frac{9}{2} \cos(2x)^0 - \frac{5}{2}$ and $y = 3 \sin\left(\frac{7}{3}x\right)^0$ on the same grid. (4 marks)



c) Use your graph to solve

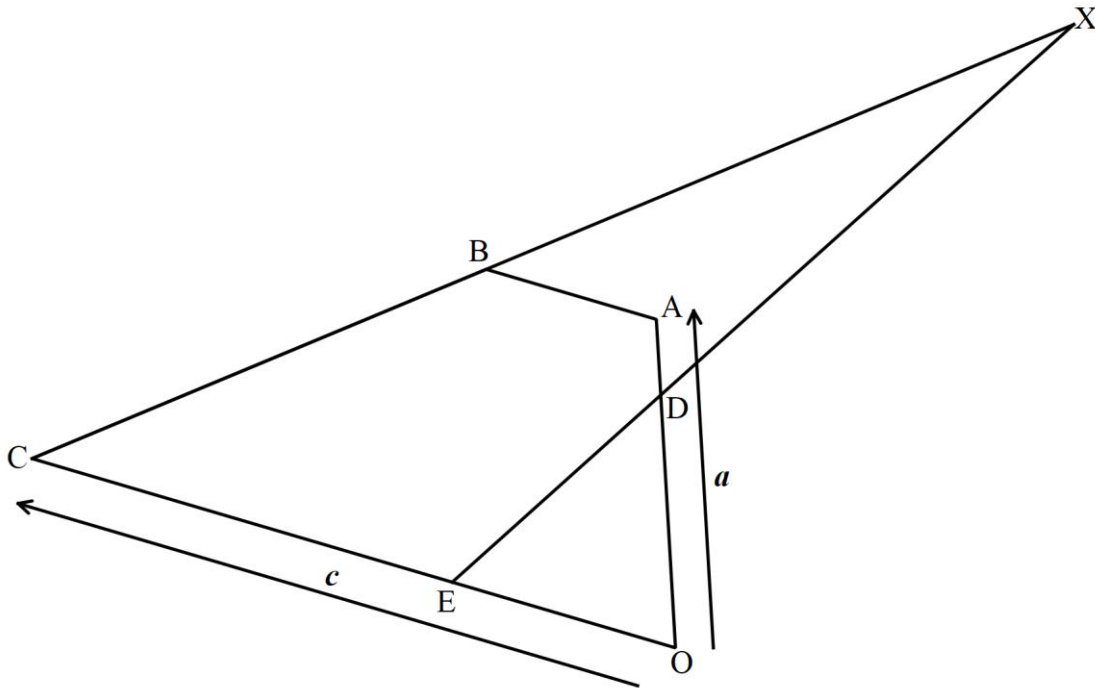
(i) $9\cos(2x) - 6\sin\left(\frac{2}{3}x\right) = 5$

(2 marks)

(ii) $9\cos(2x) < -5$

(2 marks)

19. In the figure below, OABC is a trapezium. $\mathbf{AB}$ is parallel to $\mathbf{OC}$ and $3\mathbf{OC} = 7\mathbf{AB}$. D is point on $\mathbf{OA}$ such that $OD : DA = 3 : 2$ and E is a point on $\mathbf{OC}$ such that $OE : EC = 1 : 3$



- (a) Given that $\mathbf{OC} = \mathbf{c}$ and $\mathbf{OA} = \mathbf{a}$, express in terms of $\mathbf{a}$ and $\mathbf{c}$:

(i) $\mathbf{ED}$.

(1 mark)

(ii) $\mathbf{CB}$.

(1 mark)

- (b) Line ED and CB produced intersect at X such that $\mathbf{EX} = h\mathbf{ED}$ and $\mathbf{CX} = k\mathbf{CB}$, where h and k are scalars.

(i) Express $\mathbf{EX}$ in terms of $\mathbf{a}$, $\mathbf{c}$ and h .

(1 mark)

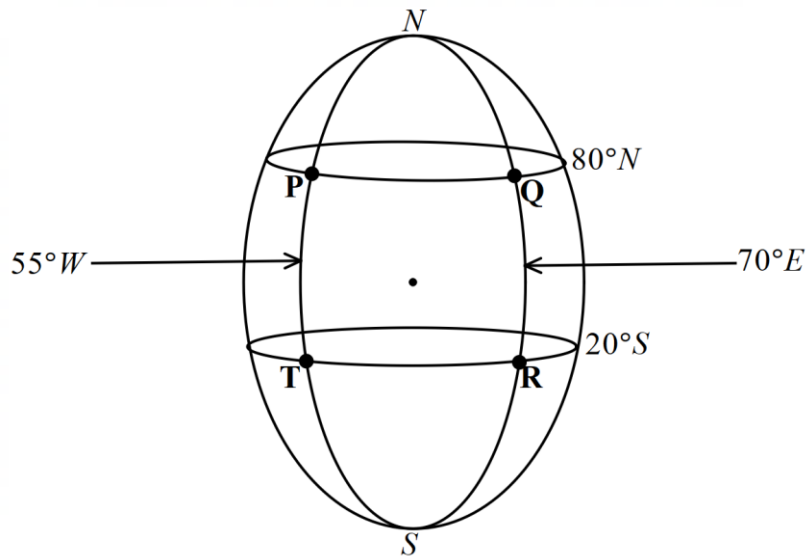
(ii) Express $\mathbf{CX}$ in terms of $\mathbf{a}$, $\mathbf{c}$ and k .

(1 mark)

(c) Determine the values of h and k .

(5 marks)

20. The points P, Q, R and T are on the surface of the Earth as shown in the diagram below. (Take $\pi = \frac{22}{7}$ and $R = 6370km$)



- a) Determine :
- the difference in latitude between points Q and R. (1 mark)
 - the length of the circle of latitude $20^{\circ}S$ in *nm* (3 marks)
 - the shorter distance TR along a parallel of latitude in *nm* (2 marks)
- b) An airplane left point P whose local time is $1326h$ and travelled due East towards point Q where it arrived at $2352h$ same day. Determine the speed of the airplane in *knots*. (4 marks)

21. The probabilities of teams A and B scoring 0,1,2,3 goals against each other in a soccer match is as shown below:

Number of goals	Probabilities of scoring	
	Team A	Team B
0	60%	40%
1	$\frac{1}{2}$	$\frac{1}{3}$
2	0.3	0.2
3	0.1	0.12

a) Use a sample space to show all the possible outcomes (3 marks)

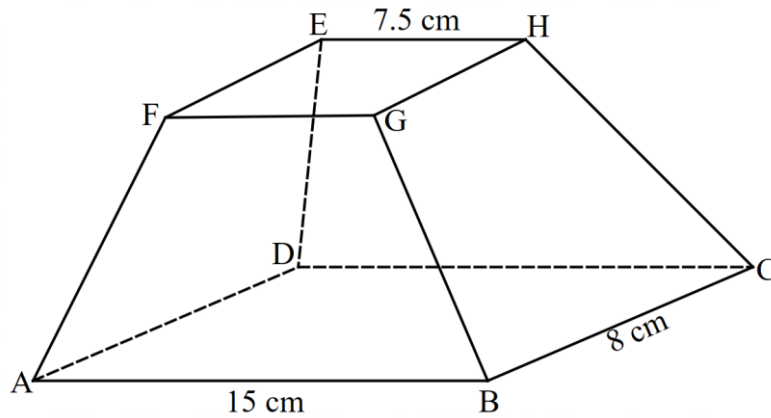
b) Calculate the probability of:

(i) Team A winning (3 marks)

(ii) A draw (2 marks)

(iii) Team B winning (2 marks)

22. The figure below shows a frustum ABCDEFGH with $AB = 15$ cm, $BC = 8$ cm and $EH = 7.5$ cm. If the vertical height of the frustum is 9 cm.



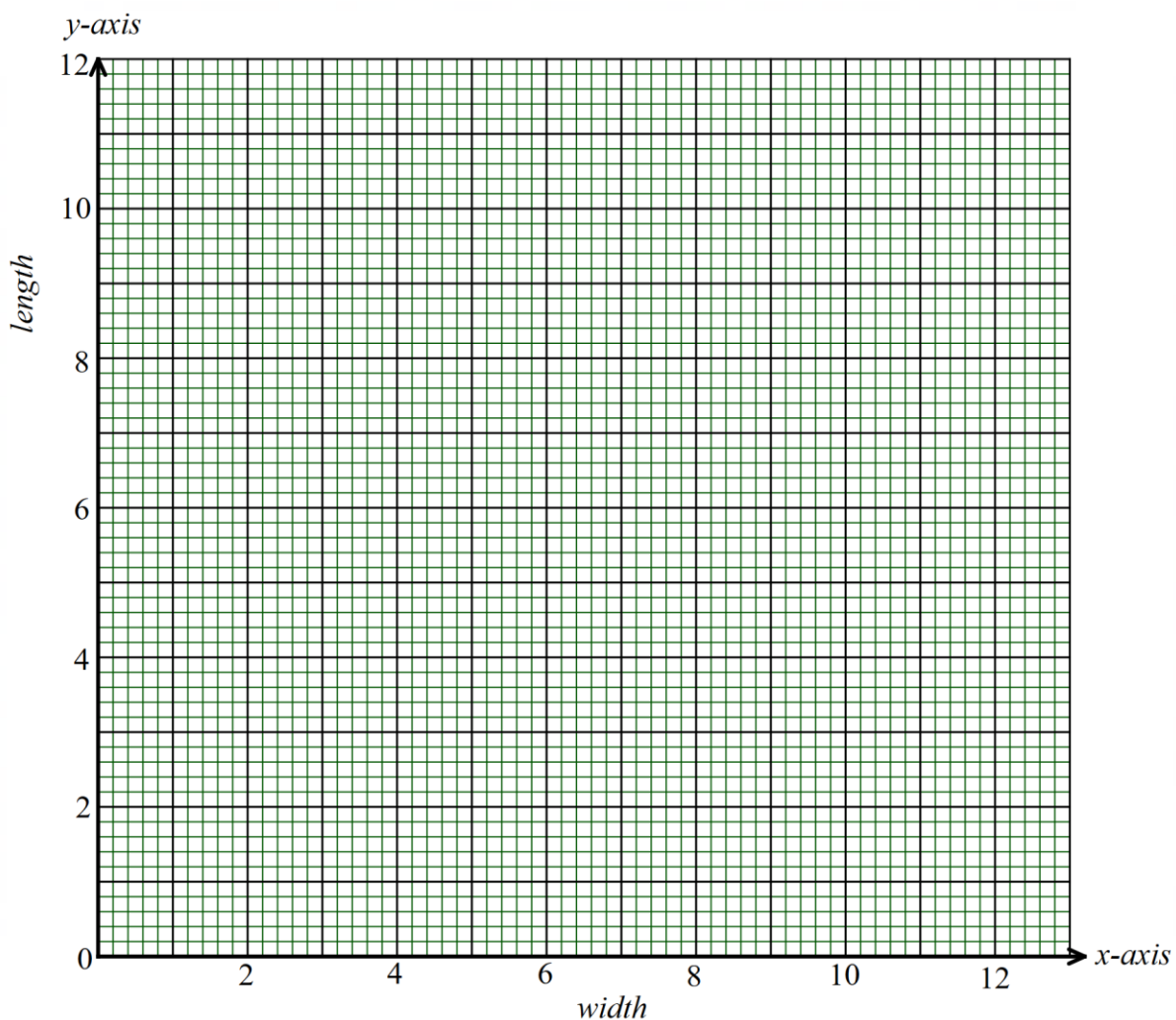
Calculate :

- The length of diagonal AC. (1 mark)
- The length of AH. (2 marks)
- The angle between the line AH and the plane ABCD. (2 marks)
- The shortest distance from vertex B to the diagonal AC. (2 marks)
- The angle between the plane BCGH and the plane ABCD. (3 marks)

23. The dimensions of a rectangular floor of a proposed room are such that:
- The length is greater than the width but at most twice the width;
 - The sum of the width and length is more than 4 metres but less than 10 metres.
- If x represents the width and y the length;

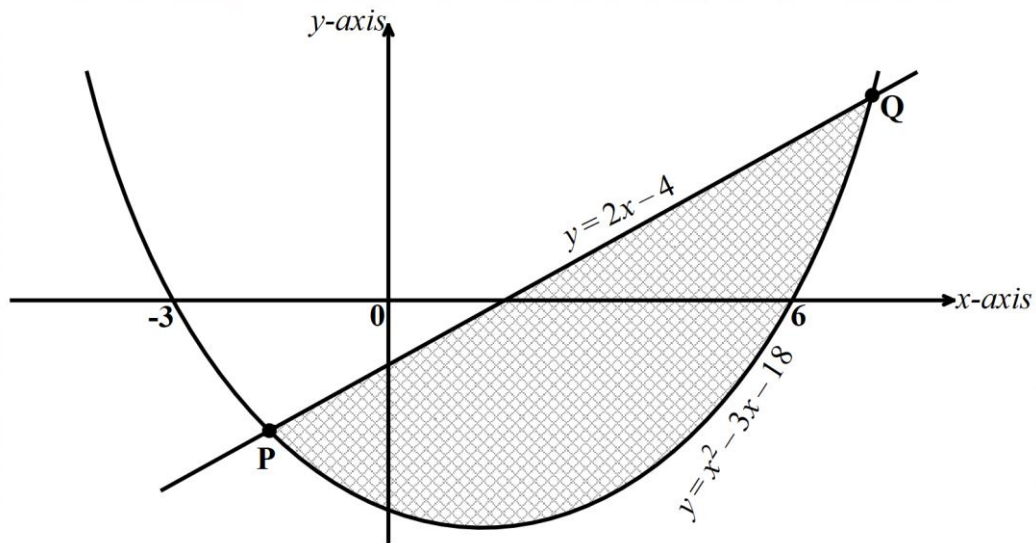
a) Form the inequalities that represent the above situation (4 marks)

b) Graph the inequalities on the grid provided (4 marks)



c) Using the integral values of x and y , list all the possible dimensions of the floor hence find the maximum possible area of the floor. (2 marks)

24. The figure below represents a sketch of the curve $y = x^2 - 3x - 18$ intersecting with the line $y = 2x - 4$ at points P and Q.



Find:

- (a) The coordinates of points P and Q (3 marks)

- (b) The area of the shaded region.
 (i) Above the x -axis (4 marks)

- (ii) Below the x -axis (3 marks)