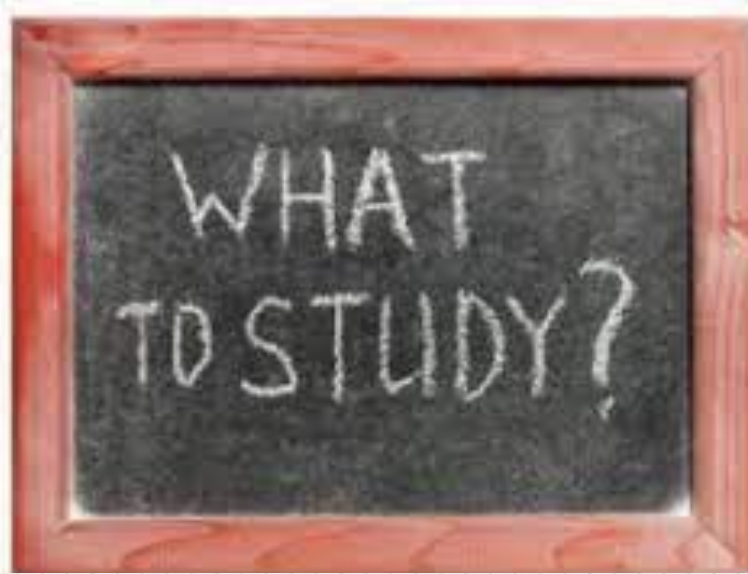J. SENTHIL SELVAN
BT MATHS
GHSS KALLUR
PUDUKKOTTAI DISTRICT
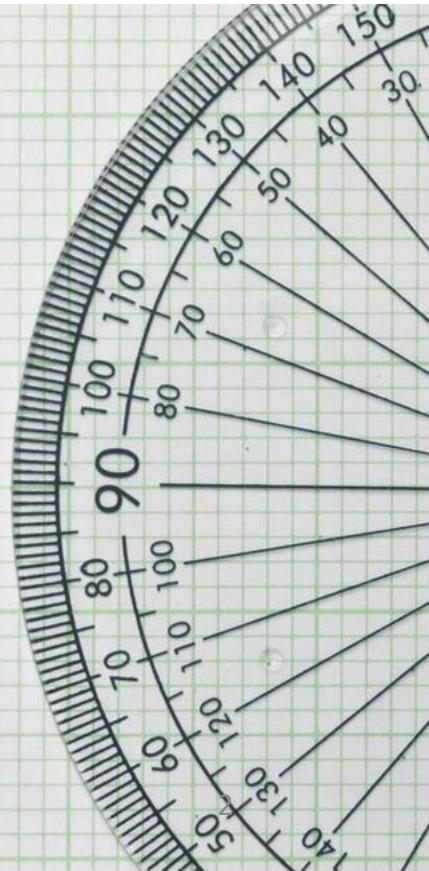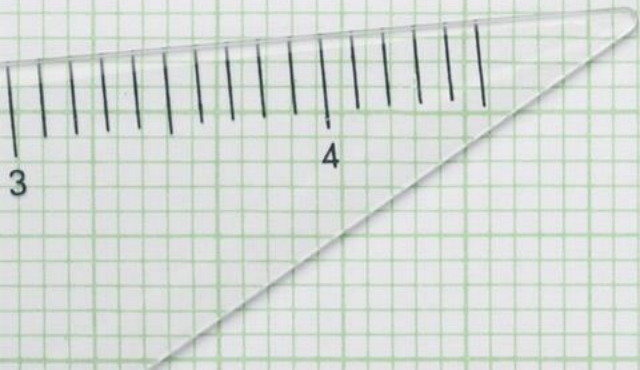
WAY TO SUCCESS

HOW TO STUDY

CONCEPTUAL UNDERSTANDING

CHAPTERS	NUMBER OF QUESTIONS
1. RELATIONS AND FUCTIONS	15
2. NUMBERS AND SEQUENCES	15
3. ALGEBRA	20
4. GEOMETRY	15
5. COORDINATE GEOMETRY	15
6. TRIGONOMETRY	15
7. MENSURATION	15
8. STATISTICS AND PROBABILITY	15

1 mark questions

125questions

DON'T DO

Given $F_1 = 1$, $F_2 = 3$ and $F_n = F_{n-1} + F_{n-2}$ then F_5 is

(A)3　　　　(B)5　　　　(C)8　　　　(D)11
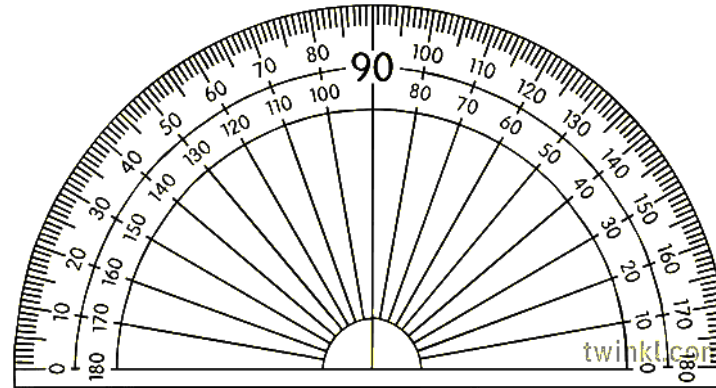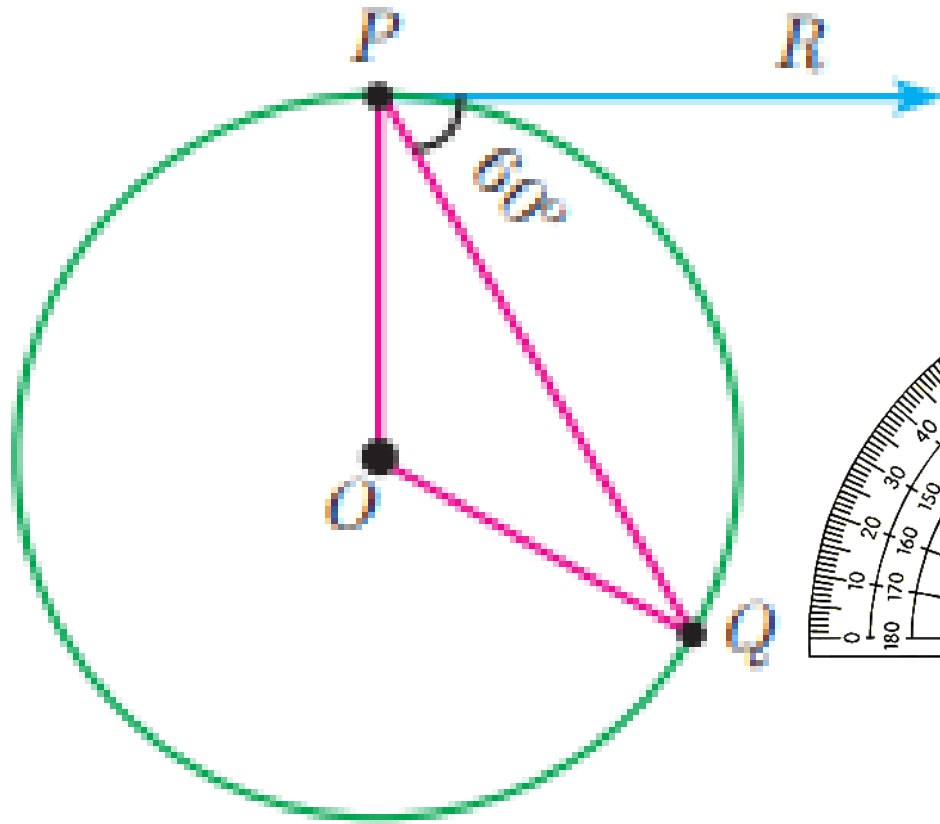
A C B C C pattern

15. In figure if PR is tangent to the circle at P and O is the centre of the circle, then $\angle POQ$ is

(A) 120°

(B) 100°

(C) 110°

(D) 90°
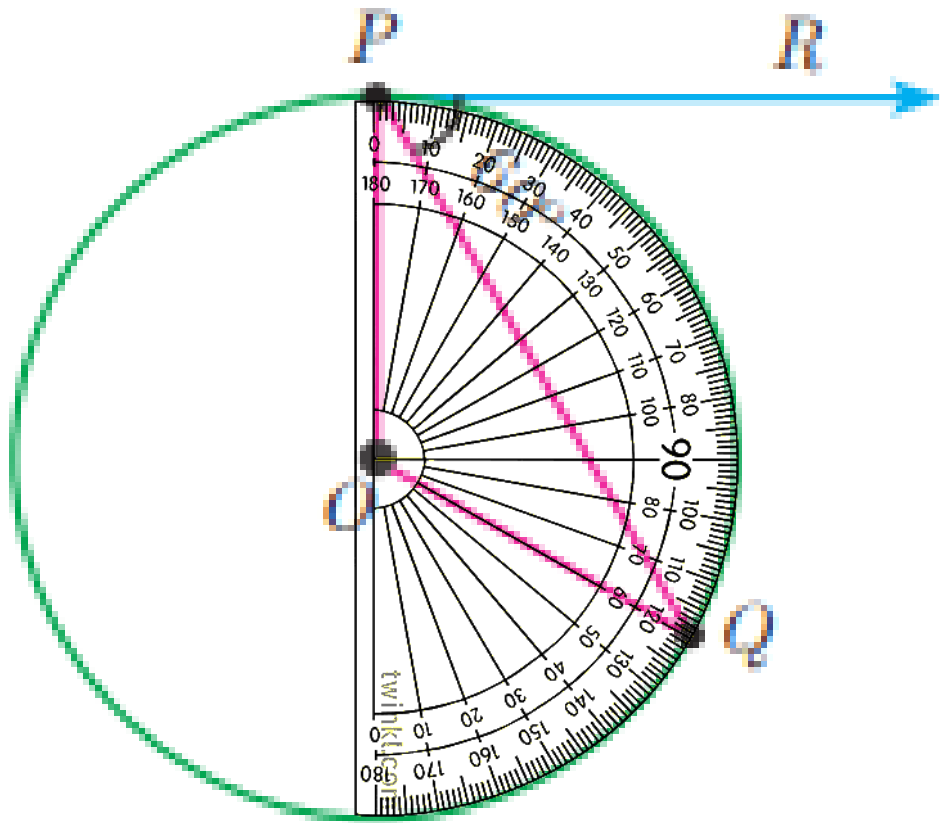
15. In figure if PR is tangent to the circle at P and O is the centre of the circle, then $\angle POQ$ is

(A) 120°

(B) 100°

(C) 110°

(D) 90°

POINTS TO REMEMBER :

Q.NO	OPTION	ANSWER
1	a	$2^{mn} - 1$

DEFINITION

PROGRESS CHECK

NOTE

THINKING CORNER

QR CODE PRACTICE QUESTIONS

UNDERSTANDING FORMULAE

7	Mensuration
7.1	Introduction
7.2	Surface Area
7.3	Volume
7.4	Volume and Surface Area of Combined Solids
7.5	Conversion of Solids from one Shape to another with no change in Volume

7.1	அறிமுகம்
7.2	புறப்பரப்பு
7.3	கன அளவு
7.4	இணைந்த உருவங்களின் கன அளவு மற்றும் புறப்பரப்பு
7.5	திண்மங்களை கனஅளவுகள் மாறாமல் மற்றொரு உருவத்திற்கு மாற்றி அமைத்தல்

$$C.S.A = 2\pi r \times h$$

$$= 2\pi r h$$

$$A = 2\pi r^2 + 2\pi r h$$

$$2\pi r h$$

$$\pi r^2 \quad \pi r^2$$

$$T.S.A = 2\pi r h + 2\pi r^2$$

$$= 2\pi r(h + r)$$

Volume = Area of Circle (base) x height

height

$$V = \pi r^2 h$$

base

$2\pi r$

ℓ

ℓ

$2\pi r$

ℓ

πr

ℓ

C.S.A = $\pi r\, l$

T.S.A = $\pi r\, l + \pi r^2$

$= \pi r(l + r)$
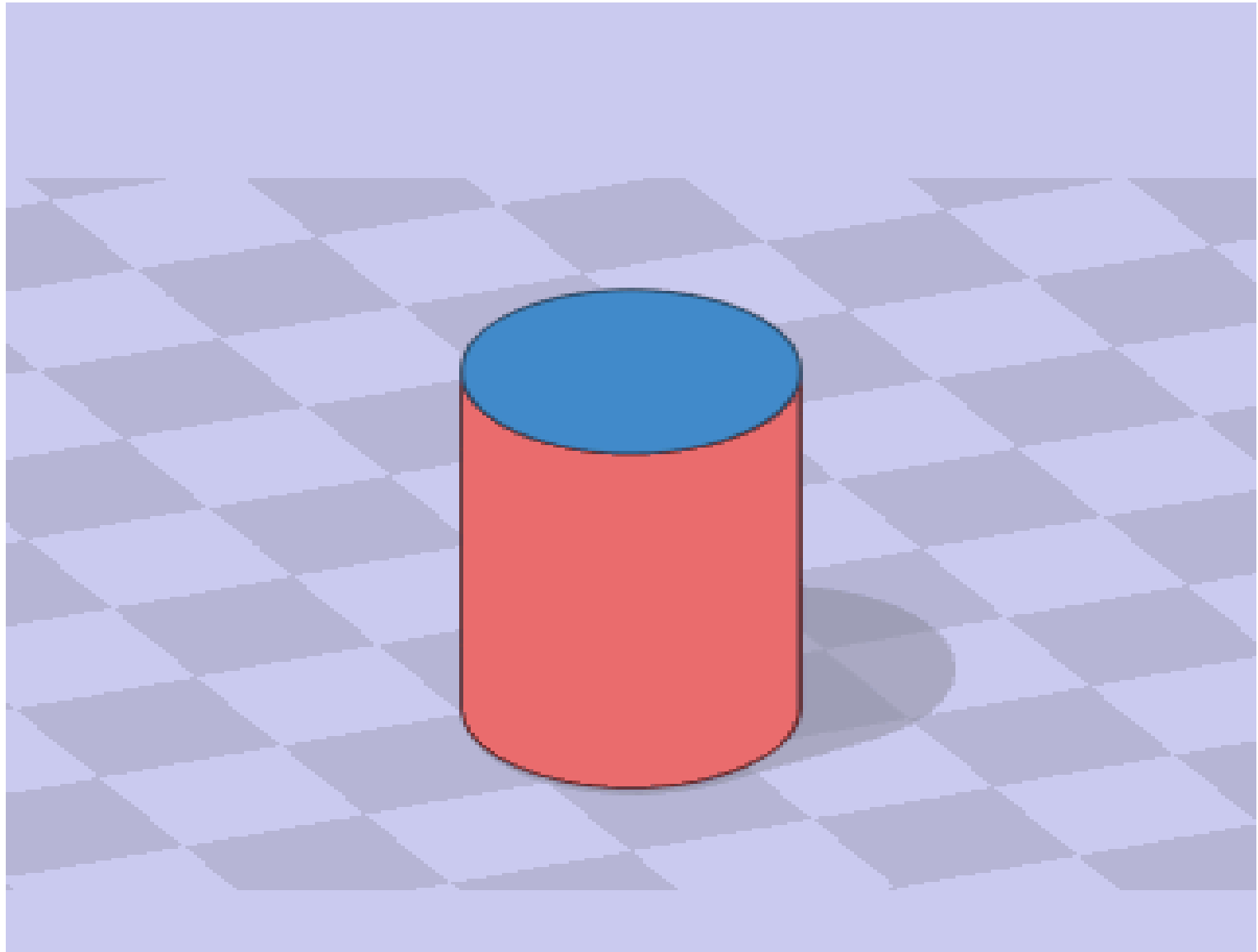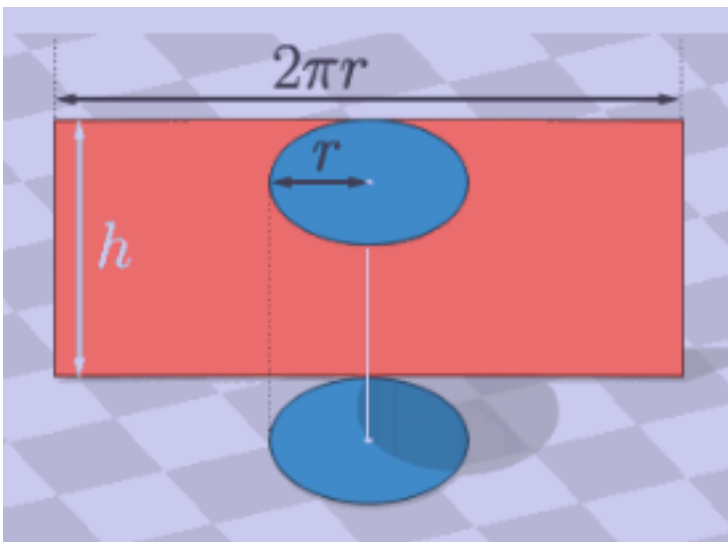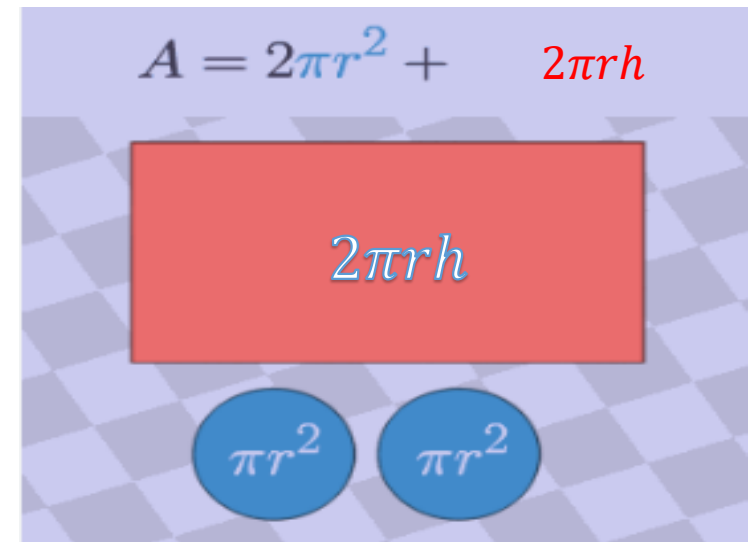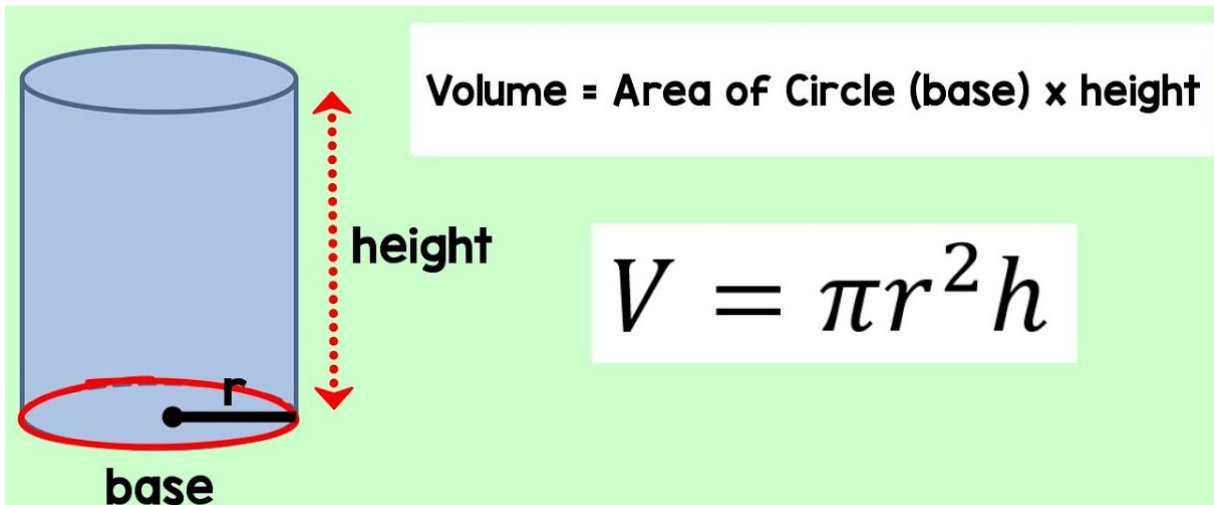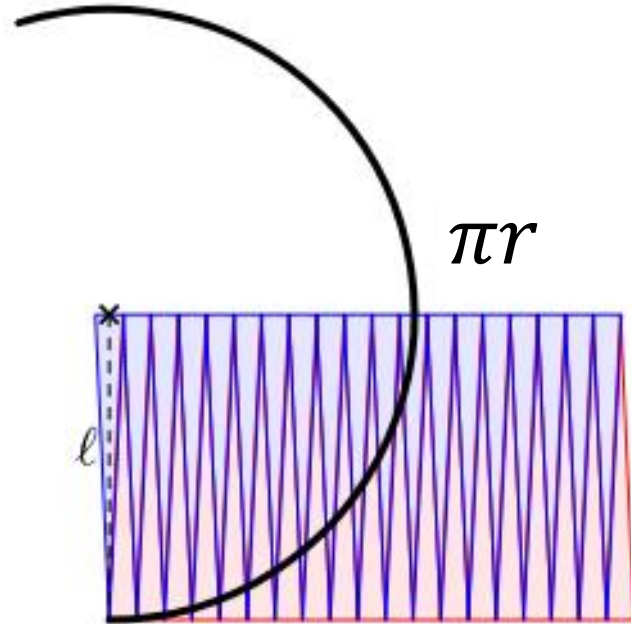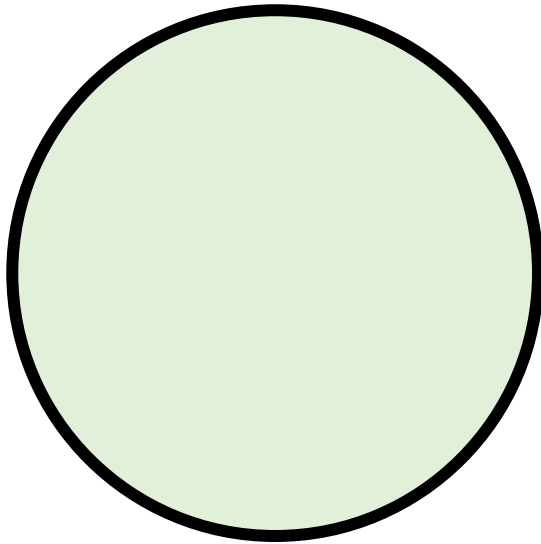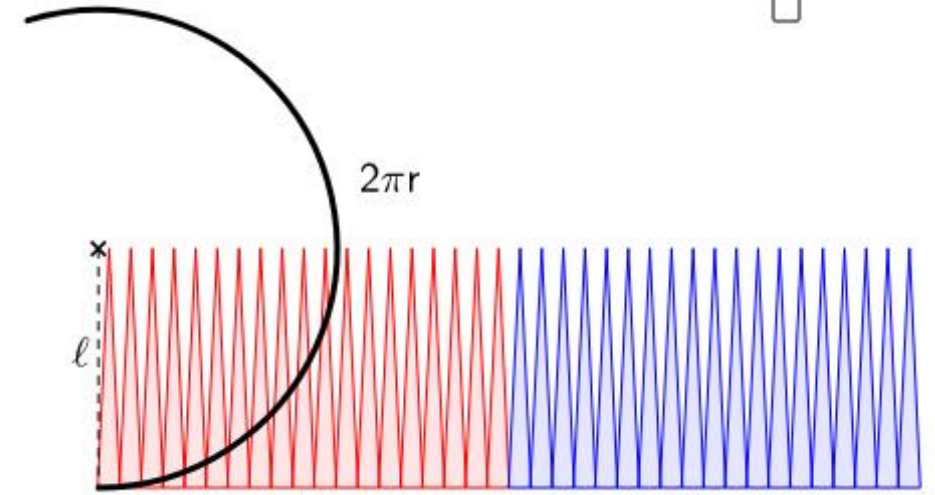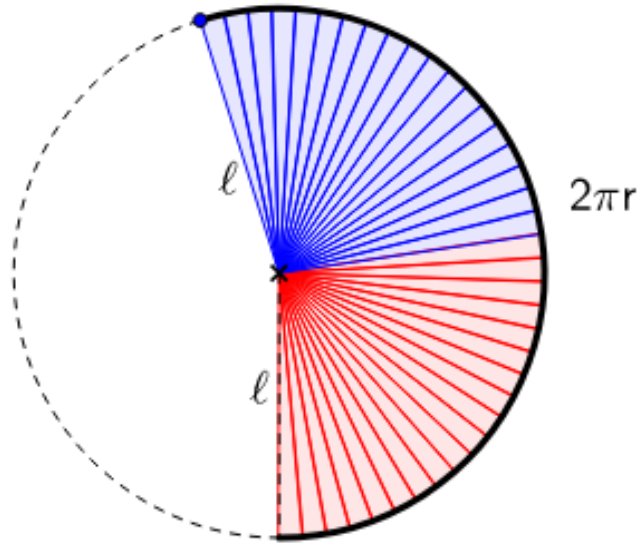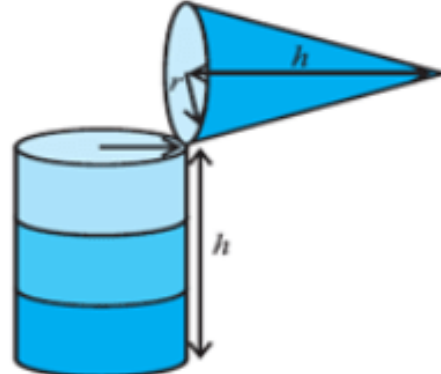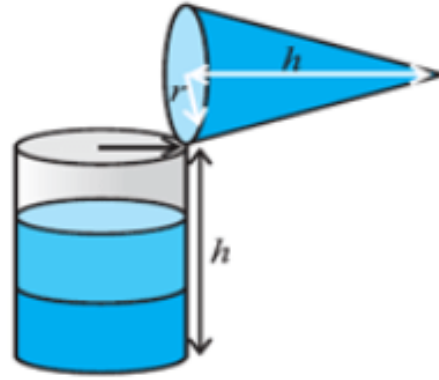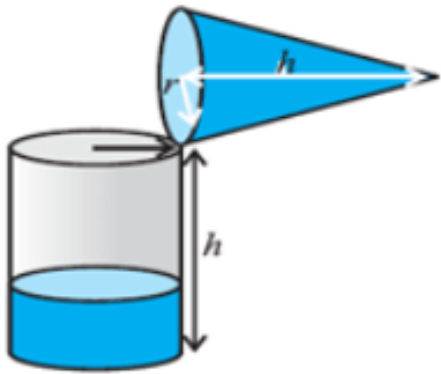
Volume of a Cone

$$volume = \frac{1}{3}\pi r^2 h$$
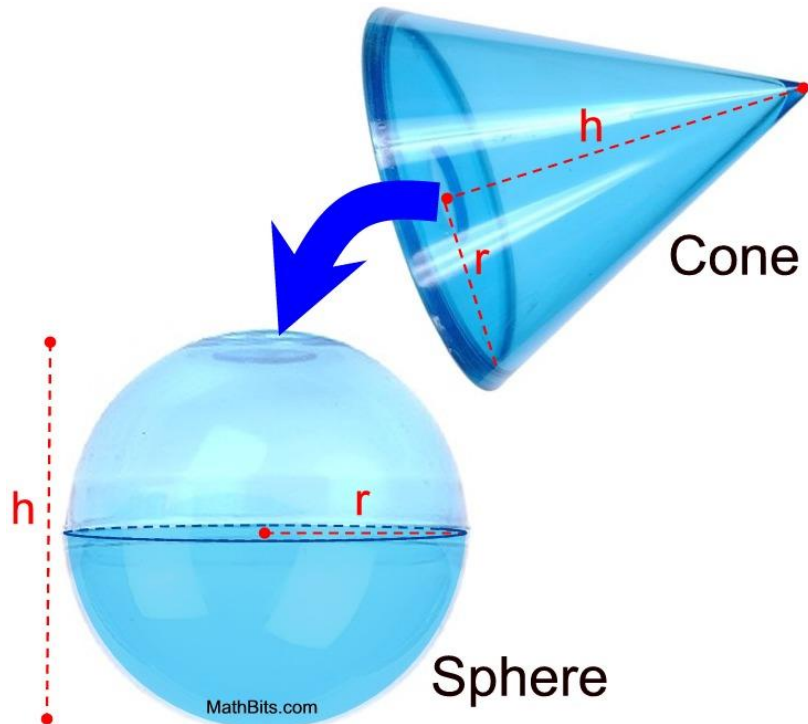
$$volume\ of\ sphere\ = 2\ x\ \frac{1}{3}\pi r^2 h$$

$$volume\ = \frac{2}{3}\pi r^2(2r)$$

$$volume\ of\ sphere = \frac{4}{3}\pi r^3$$

$$volume\ of\ Hemisphere\ = \frac{2}{3}\pi r^3$$

A girl wishes to prepare birthday caps in the form of right circular cones for her birthday party, using a sheet of paper whose area is 5720 cm^2, how many caps can be made with radius 5 cm and height 12 cm.

WHAT TO FIND?

1

$\sqrt{2} = 1.414$

$45°$

1

$\sqrt{3} = 1.732$

1

2

$30°$

$\sqrt{3} = 1.732$

2

$60°$

1
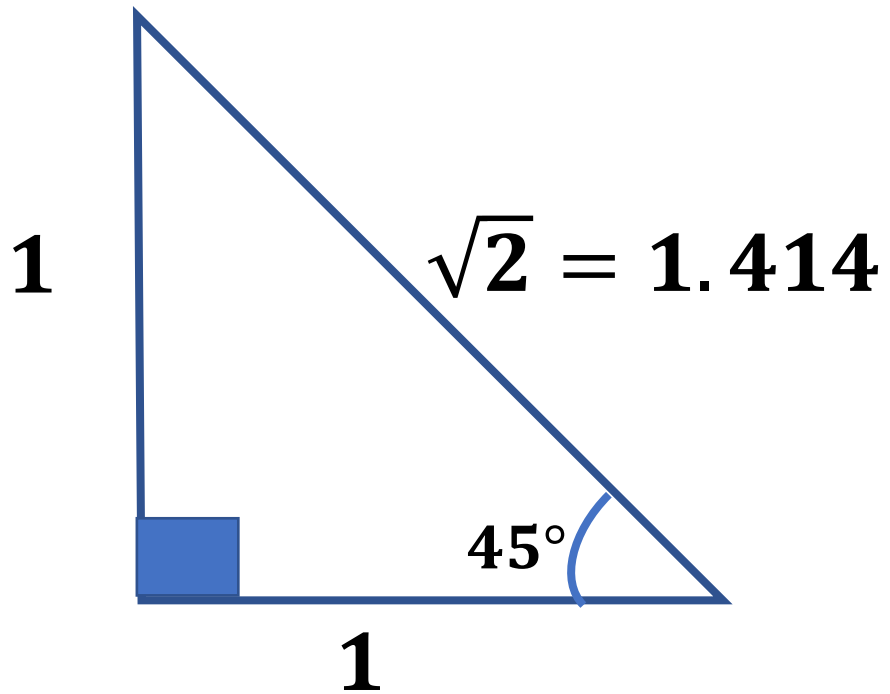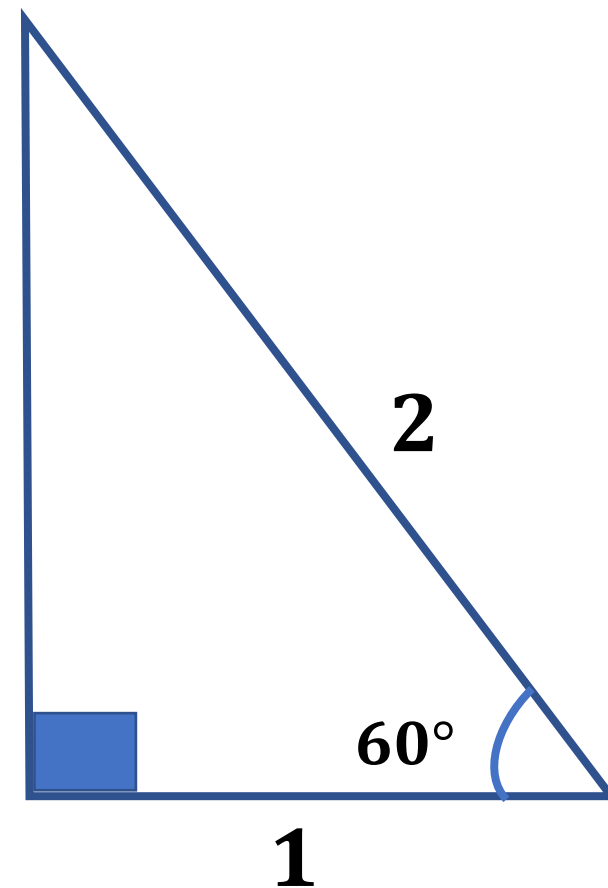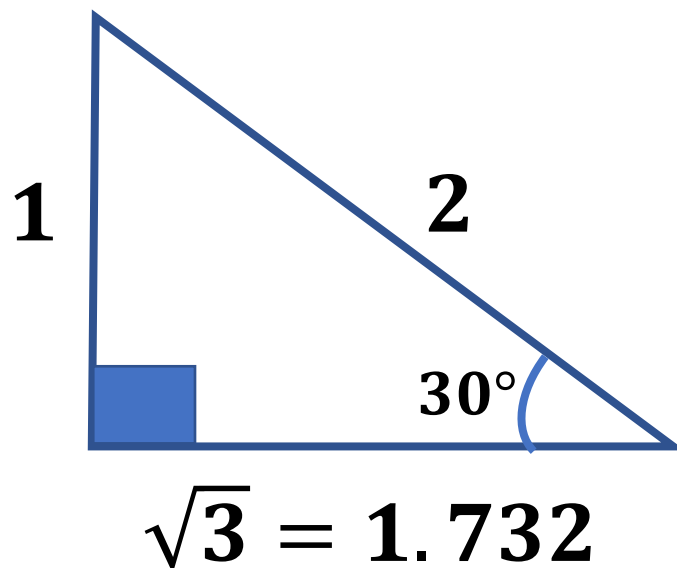
PROCEDURAL FLUENCY

PRACTICAL GEOMETRY

SIMILAR TRIANGLES	CONSTRUCTION OF TRIANGLE	CONSTRUCTION OF TANGENTS
• SCALE FACTOR < 1 • SCALE FACTOR > 1	• MEDIAN • ALTITUDE • FINDING LENGTH OF THE ALTITUDE • VERTICAL ANGLE BISECTOR MEETS THE BASE	• USING ITS CENTRE • USING ALTERNATE SEGMENT THEOREM • PAIR OF TANGENTS FROM A EXTERNAL POINT

SIMILAR TRIANGLES

$$\frac{3}{5}$$

$$\frac{7}{4}$$
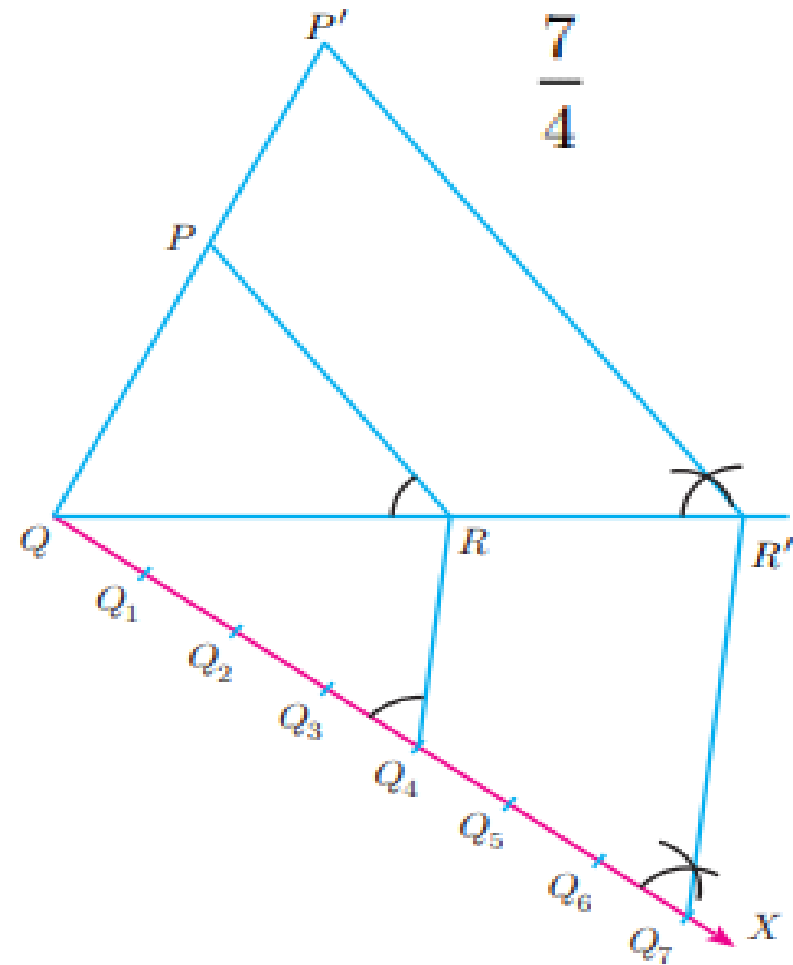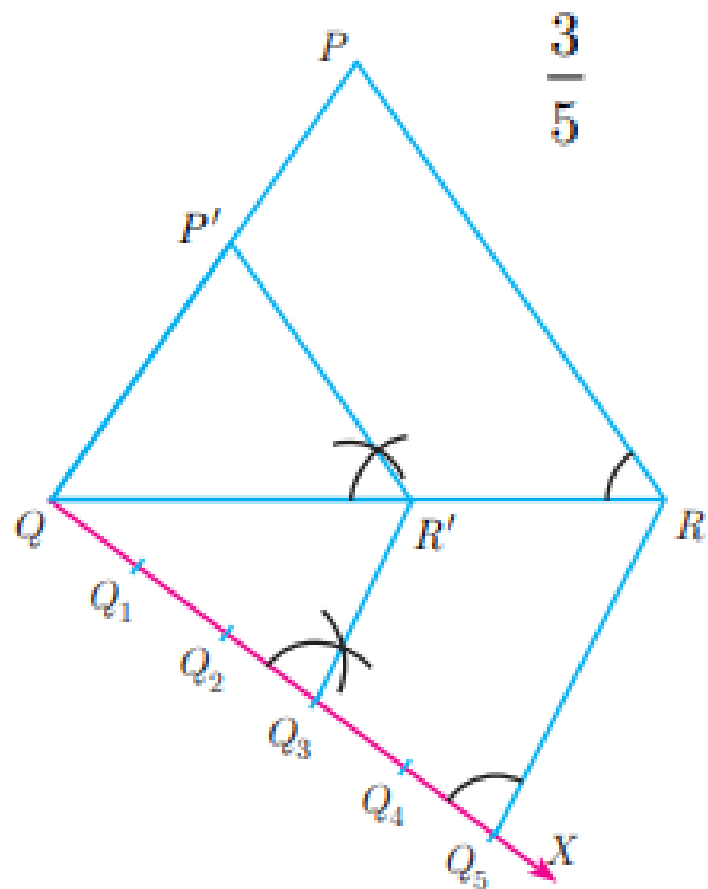
CONSTRUCTION OF TANGENTS
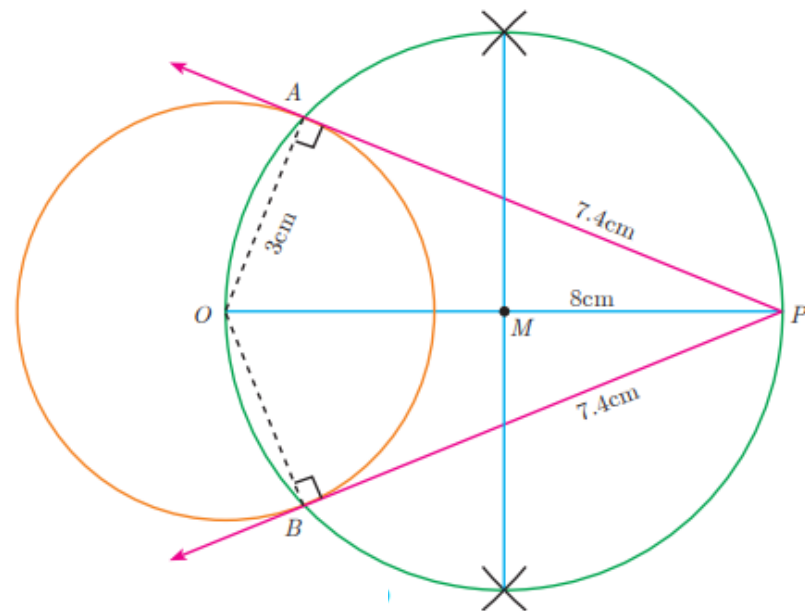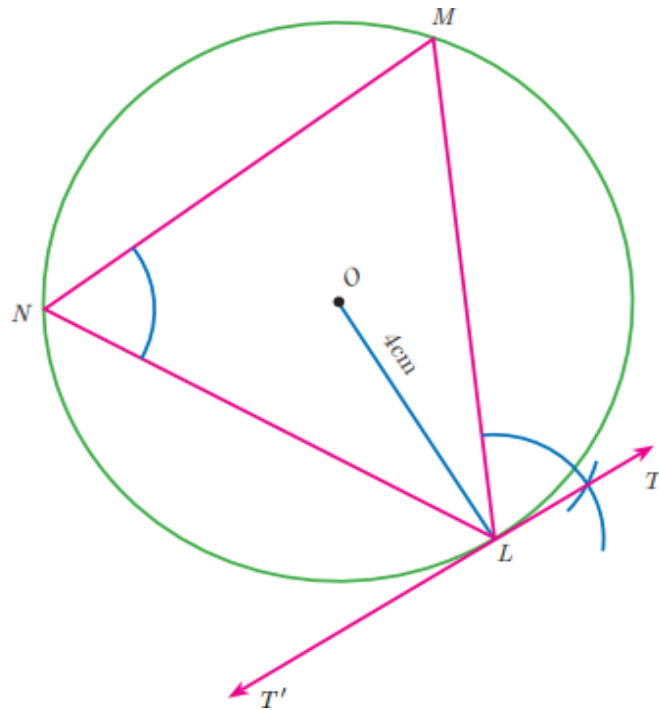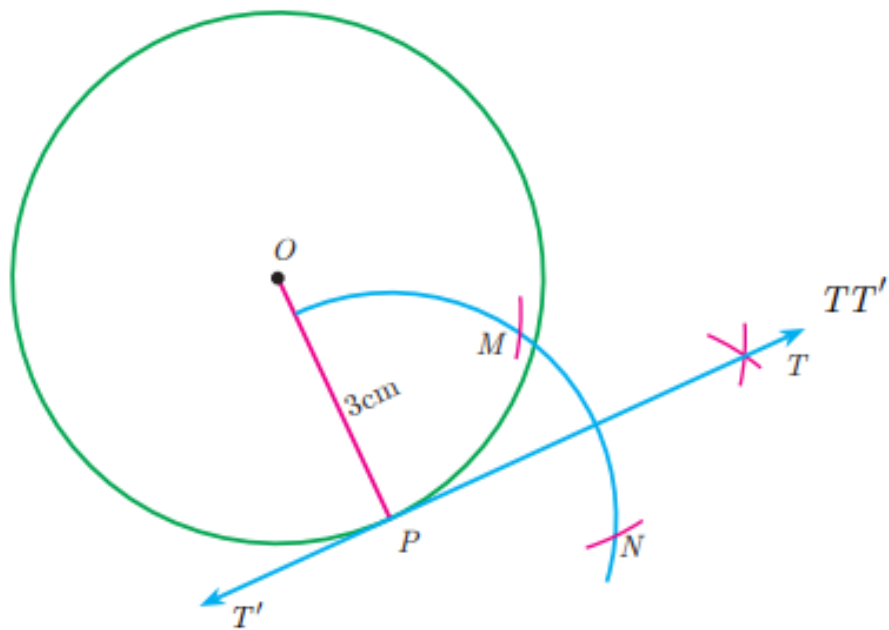
POINTS TO REMEMBER :

ROUGH DIAGRAM

NAME CORRECTLY

WRITE MEASUREMENTS

DIAMETER OR RADIUS ?

LENGTH OF THE TANGENT

$A = \begin{pmatrix} 1 & 2 & 1 \\ 2 & -1 & 1 \end{pmatrix}$ and $B = \begin{pmatrix} 2 & -1 \\ -1 & 4 \\ 0 & 2 \end{pmatrix}$ show that $(AB)^T = B^T A^T$

screen				M	E
1st row	1	2	1	2	-1
2nd row	2	-1	1	-1	4
				0	2

$A = \begin{pmatrix} 1 & 2 & 1 \\ 2 & -1 & 1 \end{pmatrix}$ and $B = \begin{pmatrix} 2 & -1 \\ -1 & 4 \\ 0 & 2 \end{pmatrix}$ show that $(AB)^T = B^T A^T$

2   -1   0

1   2   1   -1

2-2+0   2   -1   1   4

2

$$A = \begin{pmatrix} 1 & 2 & 1 \\ 2 & -1 & 1 \end{pmatrix} \text{ and } B = \begin{pmatrix} 2 & -1 \\ -1 & 4 \\ 0 & 2 \end{pmatrix} \text{ show that } (AB)^T = B^T A^T$$

			1	2	1	-1
			2	-1	0	
2-2+0			2	-1	1	4
4+1+0						2

$$A = \begin{pmatrix} 1 & 2 & 1 \\ 2 & -1 & 1 \end{pmatrix} \text{ and } B = \begin{pmatrix} 2 & -1 \\ -1 & 4 \\ 0 & 2 \end{pmatrix} \text{ show that } (AB)^T = B^T A^T$$

	1	2	1		2	-1
2-2+0				2	-1	1		-1	4
4+1+0		2					4+	0	2

$$A = \begin{pmatrix} 1 & 2 & 1 \\ 2 & -1 & 1 \end{pmatrix} \text{ and } B = \begin{pmatrix} 2 & -1 \\ -1 & 4 \\ 0 & 2 \end{pmatrix} \text{ show that } (AB)^T = B^T A^T$$

$$\begin{array}{ccc} \color{red}{-1} & \color{red}{4} & \color{red}{2} \end{array}$$

$$\begin{array}{ccc} 1 & 2 & 1 \end{array} \qquad \color{red}{2}$$

$$2\text{-}2\text{+}0 \qquad\qquad \begin{array}{ccc} 2 & -1 & 1 \end{array} \qquad 2\text{-}\color{red}{1}$$

$$4\text{+}1\text{+}0 \qquad\qquad\qquad\qquad\qquad\qquad 4\text{+}\color{red}{0}$$

$$A = \begin{pmatrix} 1 & 2 & 1 \\ 2 & -1 & 1 \end{pmatrix} \text{ and } B = \begin{pmatrix} 2 & -1 \\ -1 & 4 \\ 0 & 2 \end{pmatrix} \text{ show that } (AB)^T = B^T A^T$$

<div style="color:red">-1   4   2</div>

1   2   1   2

2-2+0   -1+8+2   2   -1   1   -1

4+1+0   4+0

$$A = \begin{pmatrix} 1 & 2 & 1 \\ 2 & -1 & 1 \end{pmatrix} \text{ and } B = \begin{pmatrix} 2 & -1 \\ -1 & 4 \\ 0 & 2 \end{pmatrix} \text{ show that } (AB)^T = B^T A^T$$

<table>
<tr><td></td><td></td><td>1</td><td>2</td><td>1</td><td></td><td style="color:red">2</td></tr>
<tr><td></td><td></td><td style="color:red">-1</td><td style="color:red">4</td><td style="color:red">2</td><td></td><td></td></tr>
<tr><td>2-2+0</td><td>-1+8+2</td><td>2</td><td>-1</td><td>1</td><td></td><td style="color:red">-1</td></tr>
<tr><td>4+1+0</td><td></td><td></td><td></td><td></td><td>4+</td><td style="color:red">0</td></tr>
</table>

$A = \begin{pmatrix} 1 & 2 & 1 \\ 2 & -1 & 1 \end{pmatrix}$ and $B = \begin{pmatrix} 2 & -1 \\ -1 & 4 \\ 0 & 2 \end{pmatrix}$ show that $(AB)^T = B^T A^T$

$$\begin{array}{ccc} & 1 & 2 & 1 \\ & & & \\ & \textcolor{red}{-1} & \textcolor{red}{4} & \textcolor{red}{2} \\ & 2 & -1 & 1 \end{array} \qquad \begin{array}{c} \textcolor{red}{2} \\ \textcolor{red}{-1} \\ \textcolor{red}{0} \end{array}$$

2-2+0   -1+8+2

4+1+0   -2-4+2

0   9

5   -4

$$A = \begin{pmatrix} 1 & 2 & 1 \\ 2 & -1 & 1 \end{pmatrix} \text{ and } B = \begin{pmatrix} 2 & -1 \\ -1 & 4 \\ 0 & 2 \end{pmatrix} \text{ show that } (AB)^T = B^T A^T$$

			1	2	1		2	-1

2-2+0	-1+8+2		2	-1	1		-1	4
4+1+0	-2-4+2						0	2

0	9
5	-4

FIND THE EQUATION OF A LINE PERPENDICULAR TO THE LINE

$$3x - 4y - 7 = 0 \qquad\qquad 5x + 7y - 5 = 0$$

$$4x + 3y + k = 0 \qquad\qquad 7x - 5y + k = 0$$

KNOW ALTERNATE METHODS

5	Coordinate Geometry
5.1	Introduction
5.2	Area of a Triangle
5.3	Area of a Quadrilateral
5.4	Inclination of a Line
5.5	Straight Line
5.6	General Form of a Straight Line
5	ஆயத்தொலை வடிவியல்
5.1	அறிமுகம்
5.2	முக்கோணத்தின் பரப்பு
5.3	நாற்கரத்தின் பரப்பு
5.4	கோட்டின் சாய்வு
5.5	நேர்க்கோடு
5.6	நேர்க்கோட்டு சமன்பாட்டின் பொது வடிவம்

5. Coordinate Geometry

Distance between two points		$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$	
Mid – point of line segment		$M\left(\dfrac{x_1+x_2}{2}, \dfrac{y_1+y_2}{2}\right)$	
Section Formula	Internal Division	$P\left(\dfrac{mx_2+nx_1}{m+n}, \dfrac{my_2+ny_1}{m+n}\right)$	
	External Division	$P\left(\dfrac{mx_2-nx_1}{m-n}, \dfrac{my_2-ny_1}{m-n}\right)$	
Centroid of a triangle		$G\left(\dfrac{x_1+x_2+x_3}{3}, \dfrac{y_1+y_2+y_3}{3}\right)$	
Area of a Triangle		$= \dfrac{1}{2}\left\{\begin{array}{l}x_1(y_2 - y_3) + x_2(y_3 - y_1) \\ \qquad + x_3(y_1 - y_2)\end{array}\right\}$ Sq. units Area of triangle $= 0 \Rightarrow$ Collinear	
Area of the quadrilateral		$= \dfrac{1}{2}\left\{\begin{array}{l}(x_1y_2 + x_2y_3 + x_3y_4 + x_4y_1) \\ -(x_2y_1 + x_3y_2 + x_4y_3 + x_1y_4)\end{array}\right\}$ Sq. units	

Equation of Straight line in various forms:

	Name	Form
1	General form	$ax + by + c = 0$
2	Point – slope form	$y - y_1 = m(x - x_1)$
3	Slope - intercept	$y = mx + c$
4	Two point form	$\dfrac{y-y_1}{y_2-y_1} = \dfrac{x-x_1}{x_2-x_1}$
5	Intercept form	$\dfrac{x}{a} + \dfrac{y}{b} = 1$
6	Parallel to Y axis	$x = c$
7	Parallel to X axis	$y = b$

Slope of a straight line $ax + by + c = 0 \Rightarrow$ Slope $m = \dfrac{-\text{coefficient of } x}{\text{coefficient of } y} = -\dfrac{a}{b}$, $\qquad y$ intercept $= \dfrac{-\text{constant term}}{\text{coefficient of } y} = -\dfrac{c}{b}$

Find the equation of a line whose intercepts on the x and y axes are given below.

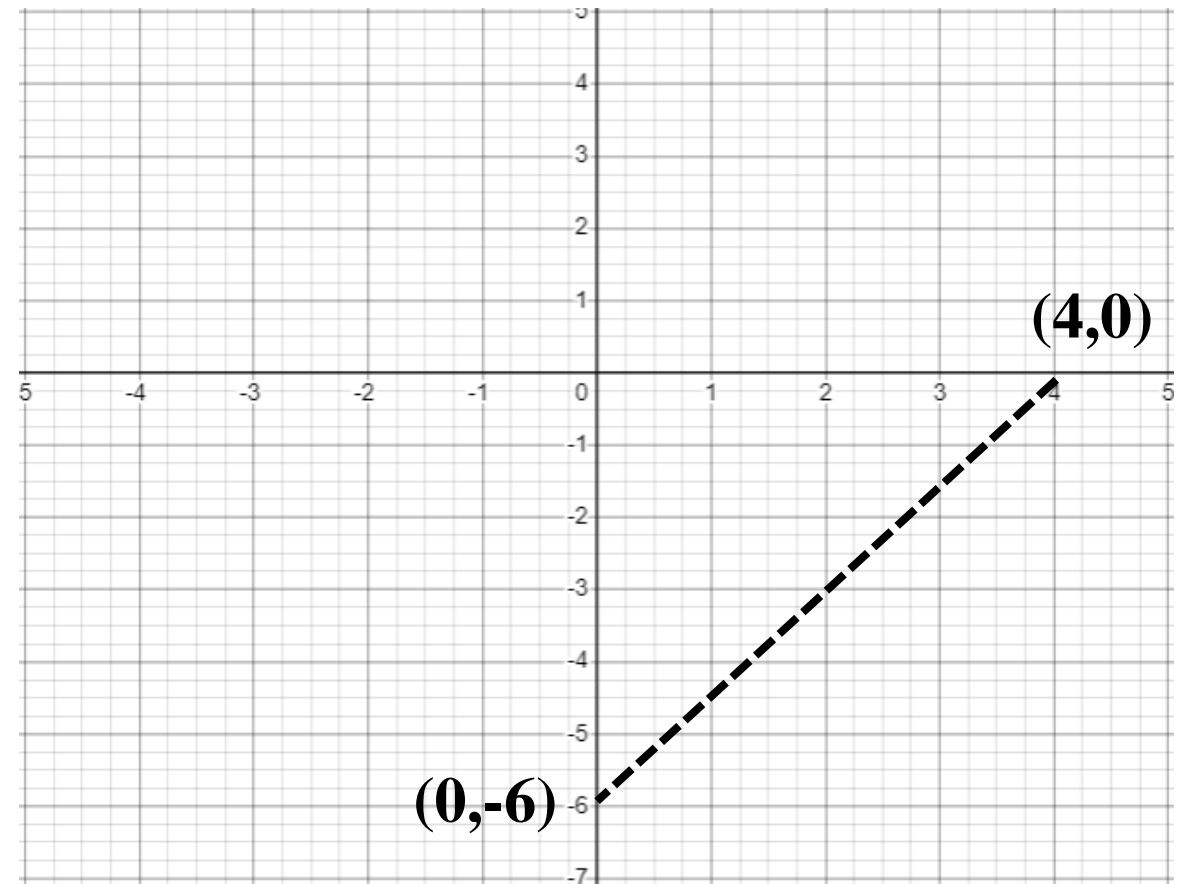4, −6   (4,0)   (0,-6)

$$m = \frac{-6 - 0}{0 - 4}$$

$$y = mx + c$$

$$m = \frac{-6}{-4}$$

$$y = \frac{3}{2}x - 6$$

$$2y = 3x - 12$$

$$m = \frac{3}{2}$$

$$3x - 2y - 12 = 0$$

(4,0)

(0,-6)

Find the equation of a straight line which has slope $\dfrac{-5}{4}$ and passing through the point $(-1,2)$.

$$m = \dfrac{-5}{4}$$

$$y = mx + c$$

$$2 = \dfrac{-5}{4}(-1) + c$$

$$8 = 5 + 4c$$

$$c = 3/4$$

$$y = mx + c$$

$$y = \dfrac{-5}{4}x + \dfrac{3}{4}$$

$$4y = -5x + 3$$

$$5x + 4y - 3 = 0$$

Find the equation of a line through the given pair of points

$(2,3)$ and $(-7,-1)$

$$m = \dfrac{-1-3}{-7-2}$$

$$m = \dfrac{4}{9}$$

$$y = mx + c$$

$$3 = \dfrac{4}{9}(2) + c$$

$$27 = 8 + 9c$$

$$c = \dfrac{19}{9}$$

$$y = mx + c$$

$$y = \dfrac{4}{9}x + \dfrac{19}{9}$$

$$9y = 4x + 19$$

$$4x - 9y + 19 = 0$$

VISUALIZING SKILL

6	Trigonometry
6.1	Introduction
6.2	Trigonometric Identities
6.3	Heights and Distances

6	முக்கோணவியல்
6.1	அறிமுகம்
6.2	முக்கோணவியல் முற்றொருமைகள்
6.3	உயரங்களும் தொலைவுகளும்

Example 6.28 From the top of a tower 50 m high, the angles of depression of the top and bottom of a tree are observed to be 30° and 45° respectively. Find the height of the tree. ($\sqrt{3} = 1.732$)
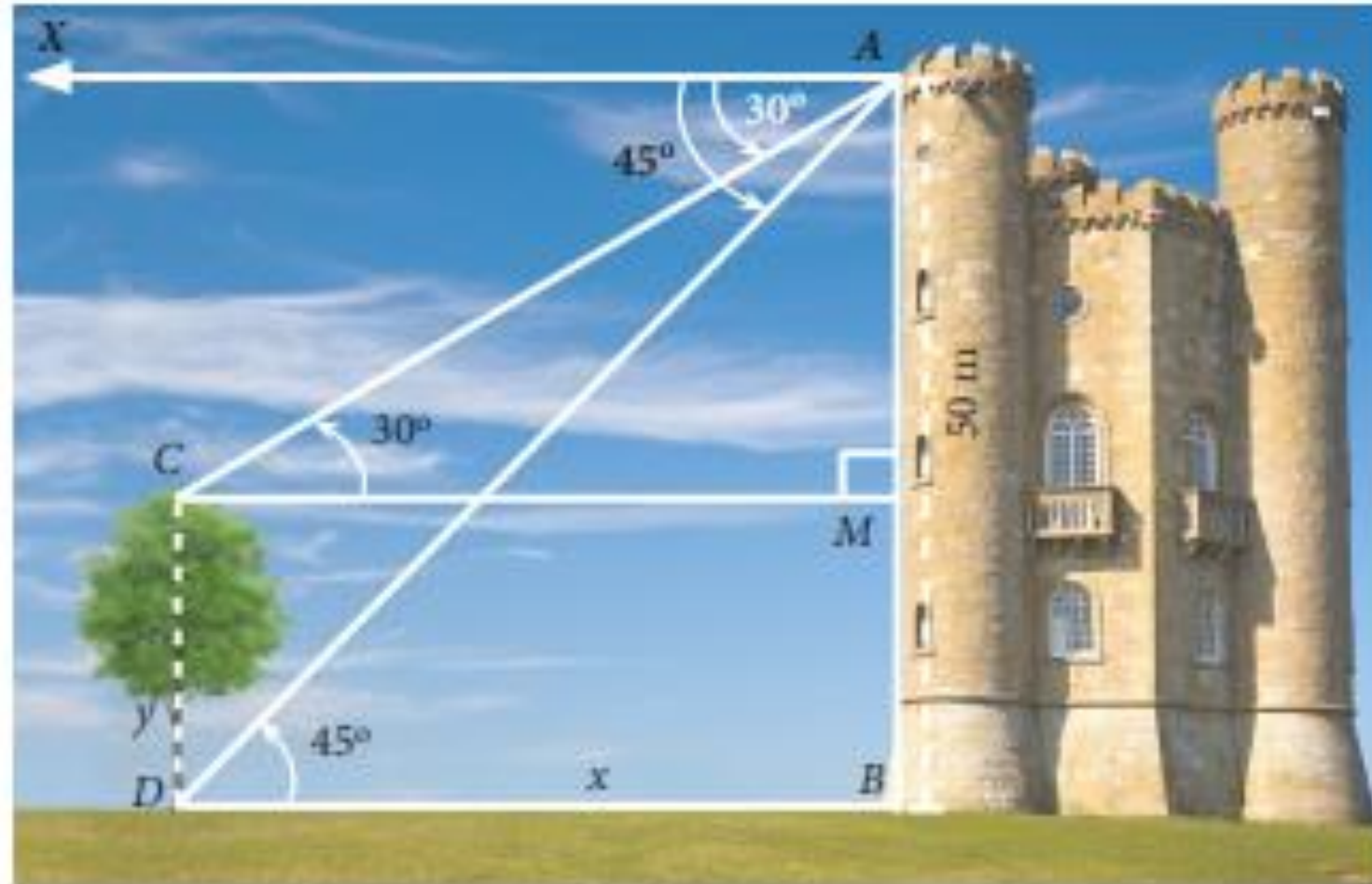
USE MNEMONIC

SOH- CAH- TOA

Example 6.20 A kite is flying at a height of 75 m above the ground. The string attached to the kite is temporarily tied to a point on the ground. The inclination of the string with the ground is $60°$. Find the length of the string, assuming that there is no slack in the string.

Fig. 6.14

GIVEN – OPPOSITE SIDE

ASKED – HYPOTENUSE

$$\sin \theta = \frac{AB}{AC}$$

$$\sin 60° = \frac{75}{AC}$$

$$\Rightarrow \quad \frac{\sqrt{3}}{2} = \frac{75}{AC} \Rightarrow AC = \frac{150}{\sqrt{3}} = 50\sqrt{3}$$

Hence, the length of the string is $50\sqrt{3}$ m.

APPROXIMATION

$200\sqrt{3}\ m$ 200 m
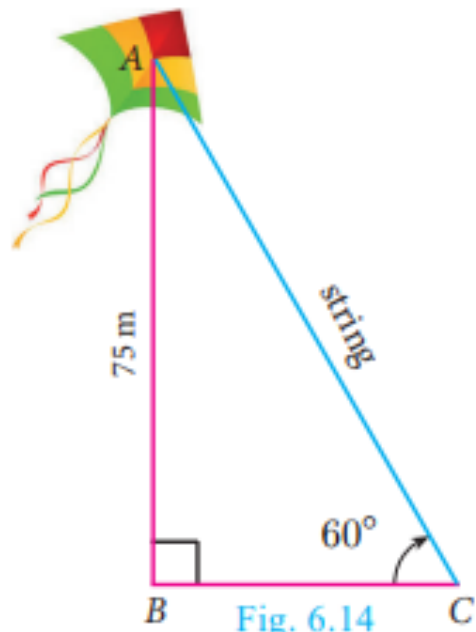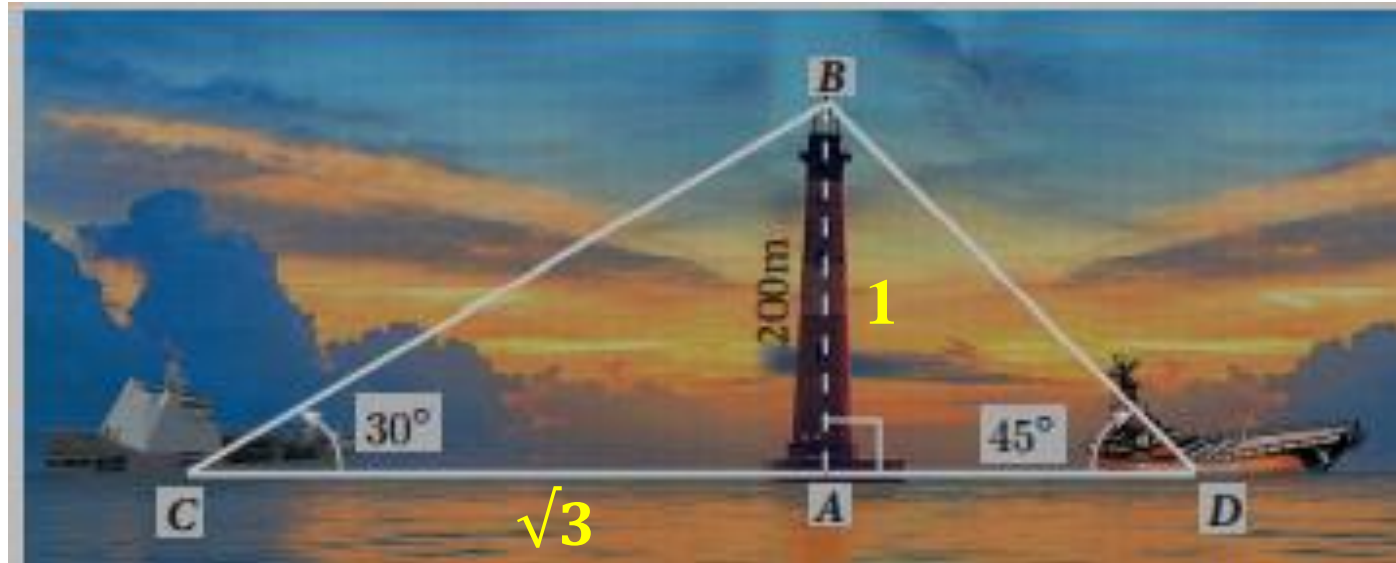
$200(\sqrt{3}+1)m$

$200(2.732)m$

$546.4m$

Example 6.28 From the top of a tower 50 m high, the angles of depression of the top and bottom of a tree are observed to be 30° and 45° respectively. Find the height of the tree. ($\sqrt{3} = 1.732$)

எடுத்துக்காட்டு 6.28 50 மீ உயரமுள்ள ஒரு கோபுரத்தின் உச்சியிலிருந்து ஒரு மரத்தின் உச்சி மற்றும் அடி ஆகியவற்றின் இறக்கக்கோணங்கள் முறையே 30° மற்றும் 45° எனில், மரத்தின் உயரத்தைக் காண்க. ($\sqrt{3} = 1.732$)
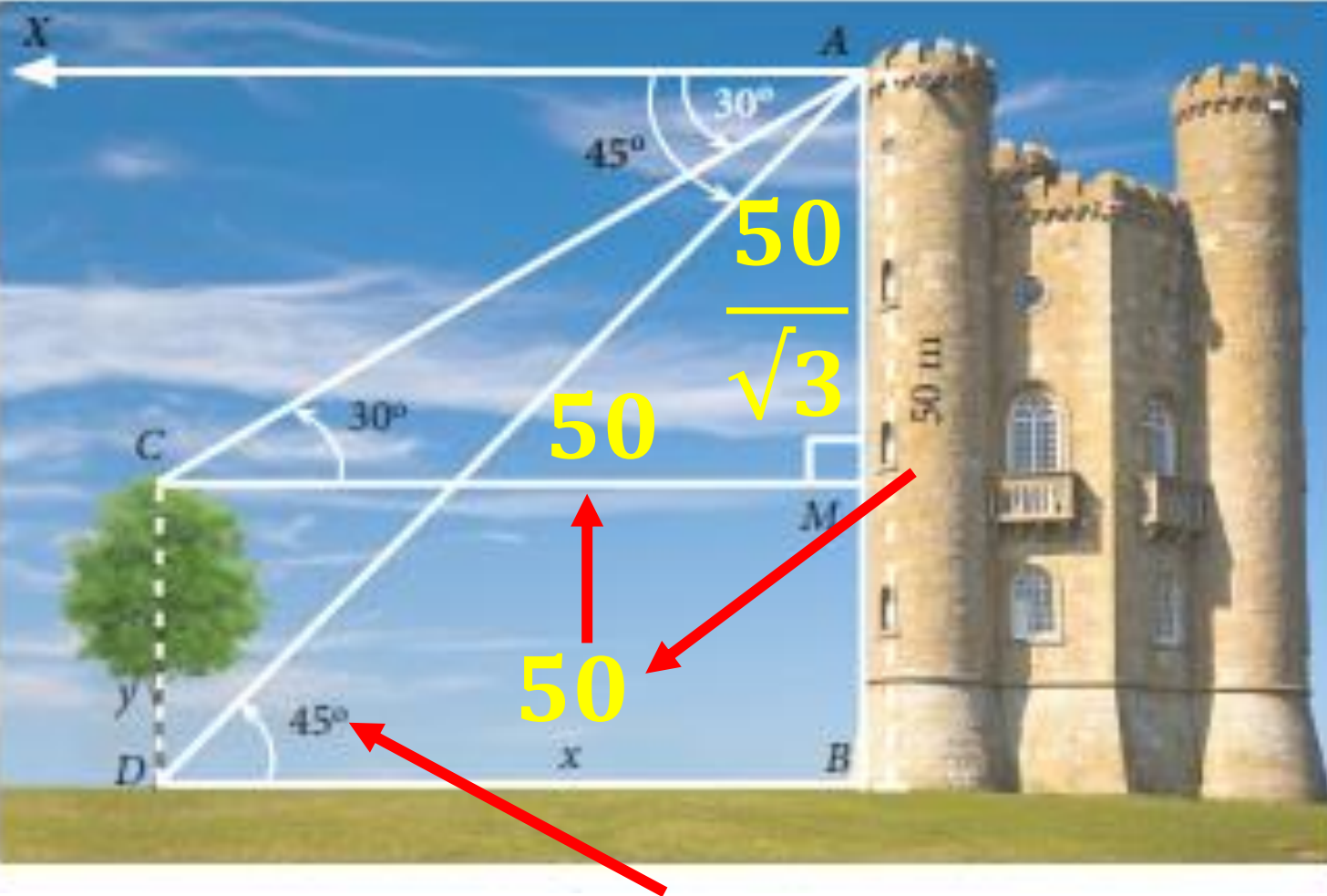
$$50 - \frac{50}{\sqrt{3}}$$

$$50 - \frac{50\sqrt{3}}{3}$$

$$50 - \frac{86.6}{3}$$

$$50 - 28.87$$

$$21.13 \; m$$

44

Standard deviation $\sigma = \sqrt{\dfrac{\Sigma d_i^{\,2}}{n}}$

$$= \sqrt{\dfrac{51.22}{6}} = \sqrt{8.53}$$

Hence, $\sigma \simeq 2.9$

$3 \; x \; 3 = 9$

Standard deviation

$$\sigma = \sqrt{\dfrac{\Sigma d_i^{\,2}}{n} - \left(\dfrac{\Sigma d_i}{n}\right)^2}$$

$$= \sqrt{\dfrac{453}{10} - \left(\dfrac{9}{10}\right)^2}$$

$$= \sqrt{45.3 - 0.81}$$

$$= \sqrt{44.49}$$

$\sigma \simeq 6.67$

$6 \; x \; 6 = 36$

$7 \; x \; 7 = 49$

DEEP PRACTICE

4	Geometry
4.1	Introduction
4.2	Similarity
4.3	Thales Theorem and Angle Bisector Theorem
4.4	Pythagoras Theorem
4.5	Circles and Tangents
4.6	Concurrency Theorems

4	வடிவியல்
4.1	அறிமுகம்
4.2	வடிவொத்தவை
4.3	தேல்ஸ் தேற்றமும், கோண இருசமவெட்டித் தேற்றமும்
4.4	பிதாகரஸ் தேற்றம்
4.5	வட்டங்கள் மற்றும் தொடுகோடுகள்
4.6	ஒருங்கிசைவுத் தேற்றம்

Theorem 1: Basic Proportionality Theorem (BPT) or Thales theorem

Theorem 3: Angle Bisector Theorem

Theorem 5 : Pythagoras Theorem

Statement	1
Figure	1
Given , To prove , Construction	1
Proof	2

Note :- If No figure then only marks allotted for statement
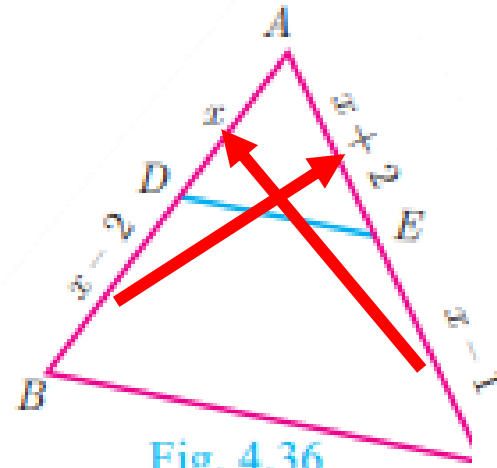
Fig. 4.36
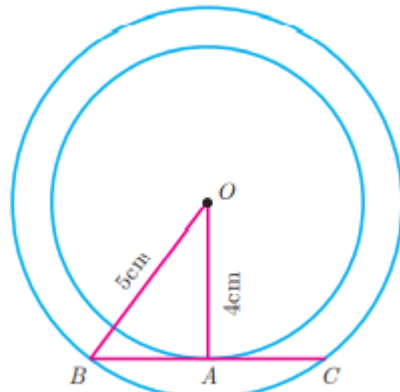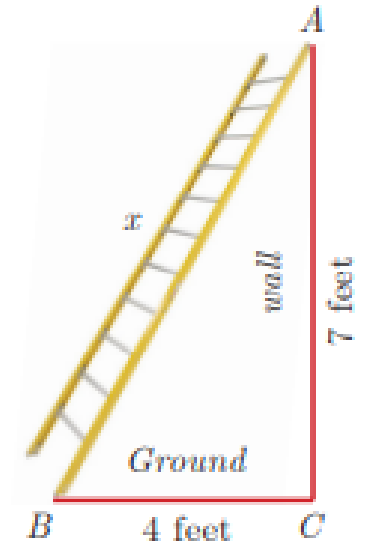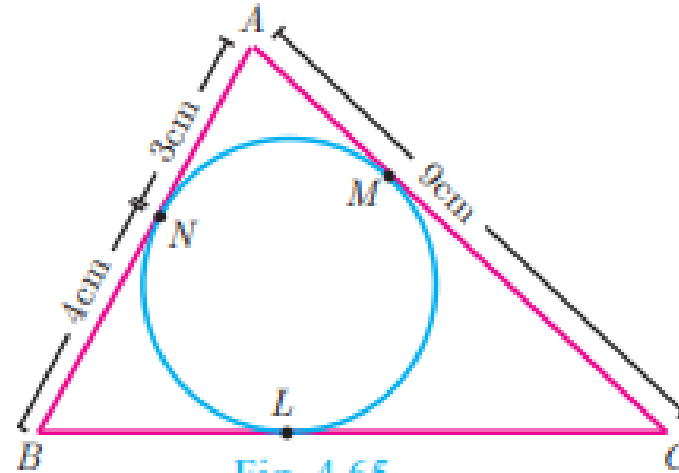
Fig. 4.66

Fig. 4.65

Theorem statements

RELATING TO REAL LIFE SITUATIONS

Example 1.8   If $X = \{-5,1,3,4\}$ and $Y = \{a,b,c\}$, then which of the following relations are functions from X to Y?

(i) $R_1 = \{(-5,a), (1,a), (3,b)\}$ (ii) $R_2 = \{(-5,b), (1,b), (3,a),(4,c)\}$

(iii) $R_3 = \{(-5,a), (1,a), (3,b),(4,c),(1,b)\}$
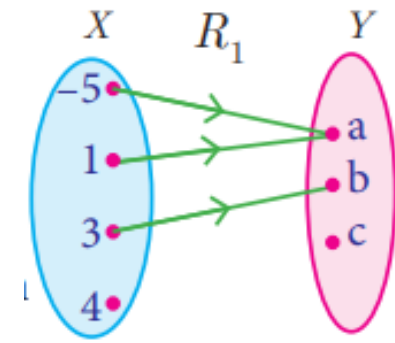
Fig. 1.15(a)
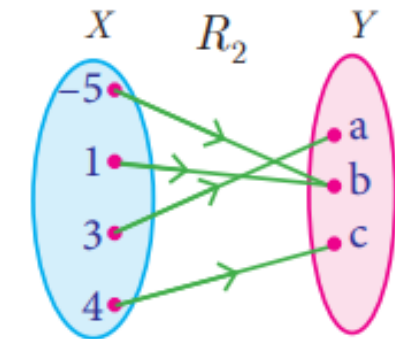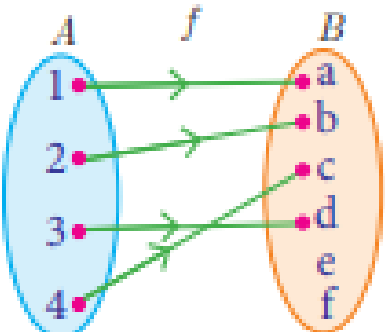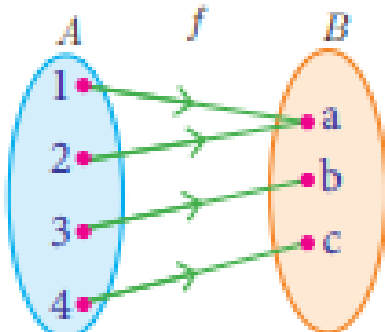
Fig. 1.15(b)
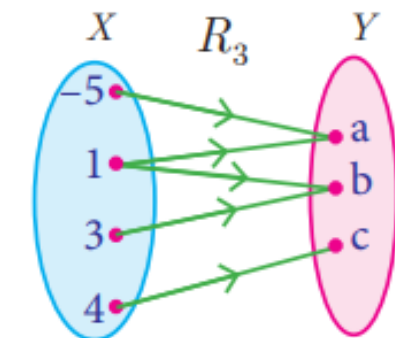
One to One	Many to One
Fig. 1.31	Fig. 1.32
Distinct elements of A have distinct images in B.	Two or more elements of A have same image in B.
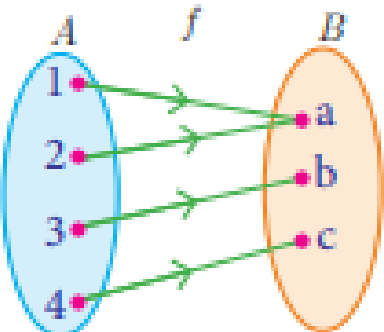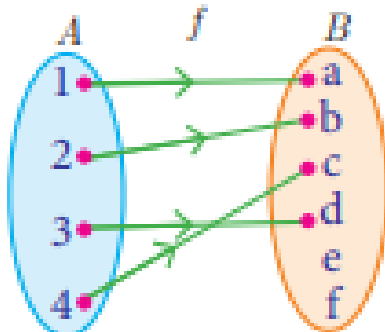
Thinking Corner

Can there be a one to many function?

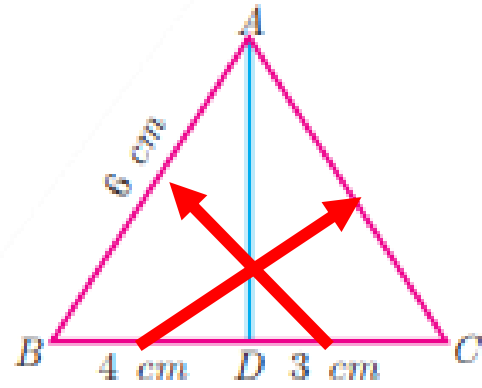| Onto	Into
Fig. 1.33	Fig. 1.34
Range of f = co-domain (Every element in B has a pre-image in A)	Range of f is a proper subset of co-domain (There exists at least one element in B which is not the image of any element of A)

53

PICK 1'S AND 2'S

Arithmetic progression

(i) The numbers of the form	$a, a + d, a + 2d, a + 3d, \ldots a + (n - 1)d$
(ii) n^{th} term	$t_n = a + (n - 1)d$
(iii) Common difference	$d = t_2 - t_1 = t_3 - t_2 = t_4 - t_3 = \cdots$ $d = t_n - t_{n-1}, n = 2,3,4, \ldots$
(iv) Total number of terms	$n = \left(\frac{l-a}{d}\right) + 1$
(v) The sum of first n terms	$S_n = \frac{n}{2}[2a + (n - 1)d]$ (OR) $S_n = \frac{n}{2}(a + l)$

Total amount for compound interest is $A = P\left(1 + \frac{r}{100}\right)^n$

Geometric progression

(i) The numbers of the form	$a, ar, ar^2, \ldots ar^{n-1}, \ldots$
(ii) n^{th} term	$t_n = ar^{n-1}$
(iii) Common ratio	$r = \frac{t_2}{t_1} = \frac{t_3}{t_2} = \frac{t_4}{t_3} = \cdots$ $r = \frac{t_n}{t_{n-1}}, n = 2,3,4, \ldots$
(iv) The sum of first n terms	$r \neq 1, r > 1$ $S_n = \frac{a(r^n - 1)}{r - 1}$ $r = 1$ $S_n = a + a + a + \cdots + a = na$ $r < 1$ $S_n = \frac{a(1 - r^n)}{1 - r}$
(v) The sum of infinite terms	$\frac{a}{1-r}, -1 < r < 1$

Special Series

Sum of first n natural numbers

$$1 + 2 + 3 + \cdots + n = \frac{n(n + 1)}{2}$$

Sum of first n odd natural numbers

$$1 + 3 + 5 + \cdots + (2n - 1) = \frac{n}{2} \times 2n = n^2$$

Sum of squares of first n natural numbers

$$1^2 + 2^2 + 3^2 + \cdots + n^2 = \frac{n(n+1)(2n+1)}{6}$$

Sum of cubes of first n natural numbers

$$1^3 + 2^3 + 3^3 + \cdots + n^3 = \left[\frac{n(n+1)}{2}\right]^2$$

Write atleast formulae

. Find the sum of all natural numbers between 602 and 902 which are not divisible by 4?

Special series

8	Statistics and Probability
8.1	Introduction
8.2	Measures of Dispersion
8.3	Coefficient of Variation
8.4	Probability
8.5	Algebra of Events
8.6	Addition Theorem of Probability
8	**புள்ளியியலும் நிகழ்தகவும்**
8.1	அறிமுகம்
8.2	பரவல் அளவைகள்
8.3	மாறுபாட்டுக் கெழு
8.4	நிகழ்தகவு
8.5	நிகழ்ச்சிகளின் செயல்பாடுகள்
8.6	நிகழ்தகவின் கூட்டல் தேற்றம்

$$\text{Range } R \ = \ L - S$$

$$\text{Coefficient of range} \ = \frac{L - S}{L + S}$$

Find the standard deviation of first 21 natural numbers.

$$\text{Coefficient of variation, C.V.} \ = \frac{\sigma}{\bar{x}} \times 100\%$$

WRITE FORMULA FOR FINDING MEAN – S.D – C.V

WRITE TABLE

TREE DIAGRAM

COINS - ATLEAST, ATMOST

DICE - PRIME NUMBERS

CARDS - FACE CARDS,NUMBERCARDS

BALL PROBLEMS

LEAP YEAR PROBLEMS

3	**Algebra**
3.1	Introduction
3.2	Simultaneous Linear Equations in Three Variables
3.3	GCD and LCM of Polynomials
3.4	Rational Expressions
3.5	Square Root of Polynomials
3.6	Quadratic Equations
3.7	Graph of Variations
3.8	Quadratic Graphs
3.9	Matrices
3	**இயற்கணிதம்**
3.1	அறிமுகம்
3.2	மூன்று மாறிகளில் அமைந்த நேரிய ஒருங்கமை சமன்பாடுகள்
3.3	பல்லுறுப்புக் கோவைகளின் மீ.பொ.வ மற்றும் மீ.பொ.ம
3.4	விகிதமுறு கோவைகள்
3.5	பல்லுறுப்புக் கோவையின் வர்க்கமூலம்
3.6	இருபடிச் சமன்பாடுகள்
3.7	மாறுபாடுகளின் வரைபடங்கள்
3.8	இருபடிச் சமன்பாடுகளின் வரைபடங்கள்
3.9	அணிகள்

RELATING TO A STORY

1/2

3.1

15

Constant of variations

1/2

50

62
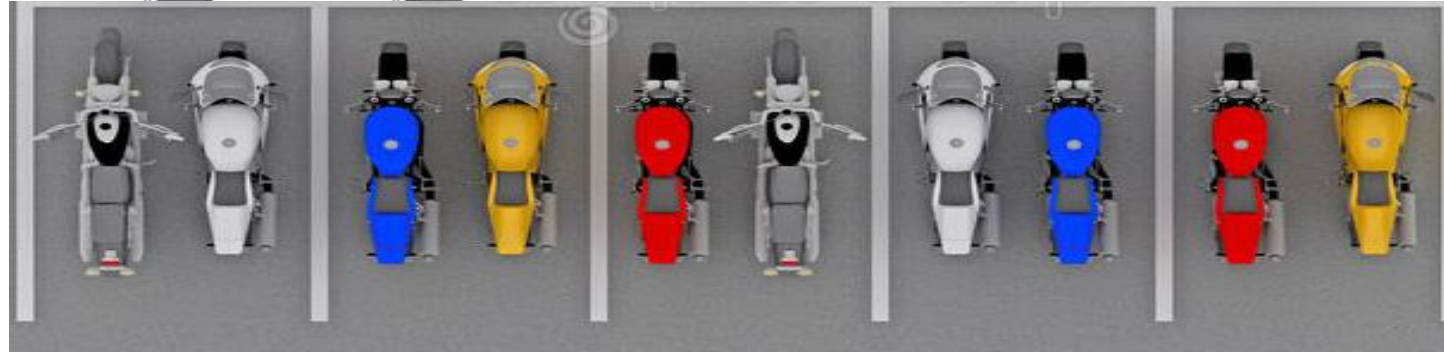
Example 3.47 Varshika drew 6 circles with different sizes. Draw a graph for the relationship between the diameter and circumference (approximately related) of each circle as shown in the table and use it to find the circumference of a circle when its diameter is 6 cm.

Diameter (x) cm	1	2	3	4	5
Circumference (y) cm	3.1	6.2	9.3	12.4	15.5

Example 3.48 A bus is travelling at a uniform speed of 50 km/hr. Draw the distance-time graph and hence find

(i) the constant of variation

(ii) how far will it travel in $1\frac{1}{2}$ hr

(iii) the time required to cover a distance of 300 km from the graph.

Graph the following linear function $y = \frac{1}{2}x$. Identify the constant of variation and verify it with the graph. Also (i) find y when $x = 9$ (ii) find x when $y = 7.5$.

A garment shop announces a flat 50% discount on every purchase of items for their customers. Draw the graph for the relation between the Marked Price and the Discount. Hence find

(i) the marked price when a customer gets a discount of ₹3250 (from graph)

(ii) the discount when the marked price is ₹2500

A two wheeler parking zone near bus stand charges as below.

Time (in hours) (x)	4	8	12	24
Amount ₹ (y)	60	120	180	360

Check if the amount charged are in direct variation or in inverse variation to the parking time. Graph the data. Also (i) find the amount to be paid when parking time is 6 *hr*; (ii) find the parking duration when the amount paid is ₹150.

DIRECT VARIATION GRAPHS

Constant of variations

360

90

12

24

6000

64

Nishanth is the winner in a Marathon race of 12 km distance. He ran at the uniform speed of 12 km/hr and reached the destination in 1 hour. He was followed by Aradhana, Jeyanth, Sathya and Swetha with their respective speed of 6 km/hr, 4 km/hr, 3 km/hr and 2 km/hr. And, they covered the distance in 2 hrs, 3 hrs, 4 hrs and 6 hours respectively.

Draw the speed-time graph and use it to find the time taken to Kaushik with his speed of 2.4 km/hr.

Draw the graph of $xy = 24$, $x,y > 0$. Using the graph find,

(i) y when $x = 3$ and (ii) x when $y = 6$.

A school announces that for a certain competitions, the cash price will be distributed for all the participants equally as show below

No. of participants (x)	2	4	6	8	10
Amount for each participant in ₹ (y)	180	90	60	45	36

(i) Find the constant of variation.
(ii) Graph the above data and hence, find how much will each participant get if the number of participants are 12.

The following table shows the data about the number of pipes and the time taken to fill the same tank.

Example 3.49 A company initially started with 40 workers to complete the work by 150 days. Later, it decided to fasten up the work increasing the number of workers as shown below.

Number of workers (x)	40	50	60	75
Number of days (y)	150	120	100	80

(i) Graph the above data and identify the type of variation.
(ii) From the graph, find the number of days required to complete the work if the company decides to opt for 120 workers?
(iii) If the work has to be completed by 200 days, how many workers are required?

No. of pipes (x)	2	3	6	9
Time Taken (in min) (y)	45	30	15	10

Draw the graph for the above data and hence

(i) find the time taken to fill the tank when five pipes are used
(ii) Find the number of pipes when the time is 9 minutes.

INDIRECT VARIATION GRAPHS

GRAPHS OF VARIATION

DIRECT

INDIRECT

QUADRATIC GRAPHS

NATURE OF SOLUTIONS

SOLVING THROUGH INTERSECTION OF LINES

CROSS CHECK

$$2x^2 - 7x - 3$$

$$2x^2 \overline{\smash{\big)}\, 4x^4 - 28x^3 + 37x^2 + 42x + 9}$$

$$(-)$$

$$4x^4$$

$$4x^2 - 7x \quad \begin{array}{r} -28x^2 + 37x^2 \\ (+) \quad (-) \\ -28x^3 + 49x^2 \end{array}$$

$$4x^2 - 14x - 3 \quad \begin{array}{r} -12x^2 + 42x + 9 \\ (+) \quad (-) \quad (-) \\ -12x^2 + 42x + 9 \\ \hline 0 \end{array}$$

$$\sqrt{4} = 2$$

$$\frac{28}{2} = 14$$

$$\frac{14}{2} = 7$$

$$\sqrt{9} = 3$$

68

$$x^2 - 9x + 20 = 0$$

$$(x - 4)(x - 5) = 0$$

$$x = 4 \ or \ x = 5$$

$F = (0, -6)$ -6 **5** $E = (5, -6)$

-7

$f : y = x^2 - 5x - 6$

4 -8

$$x^2 - 5x - 6$$

-9

3

-10 $D = (1, -10)$ $C = (4, -10)$

2 -11

f

1

$A = (2, -12)$ -12 $B = (3, -12)$

$$x^2 + 2x - 3$$

f : y = x² + 2x − 3

F = (-4, 5)   E = (2, 5)

H = (-3, 0)   G = (1, 0)

D = (-2, -3)   f   C = (0, -3)

A = (-1, -4)

6

5

4

3

2

1

$x^2 - 4$

F = (-3, 5)   6   E = (3, 5)

5

4

H = (-2, 0)   G = (2, 0)

3

2

D = (-1, -3)   f   C = (1, -3)

1   A = (0, -4)

f : $y = x^2 - 4$
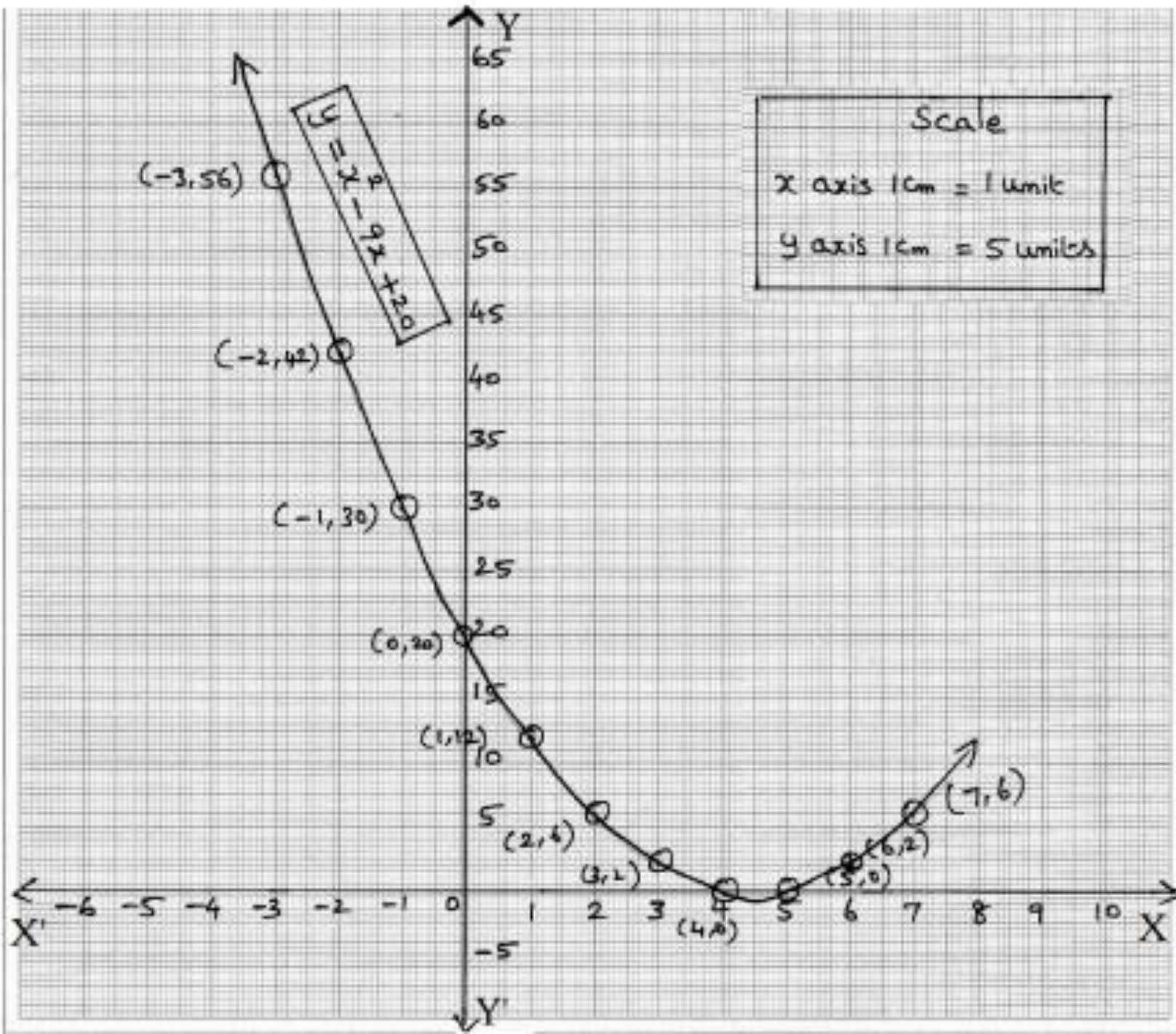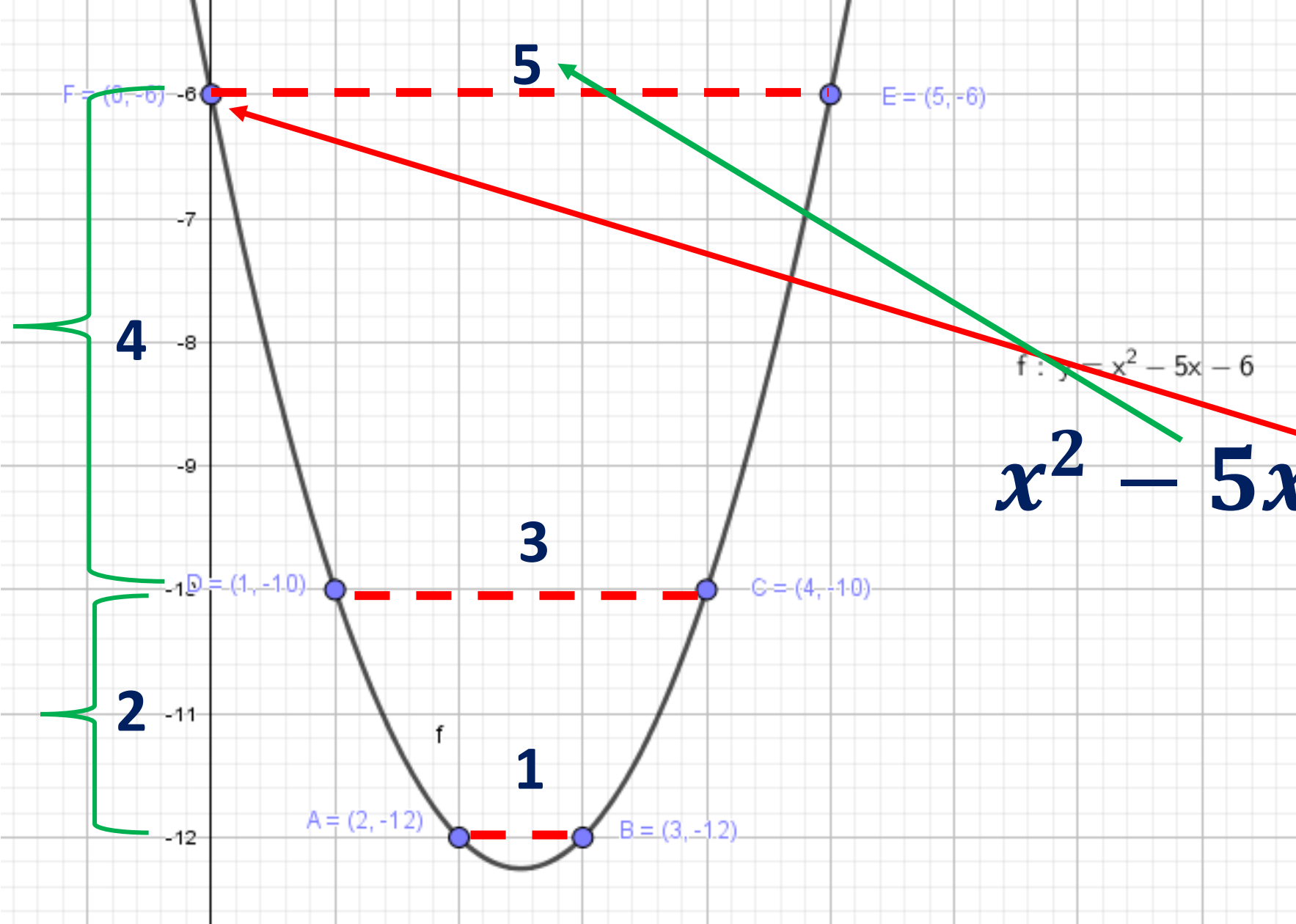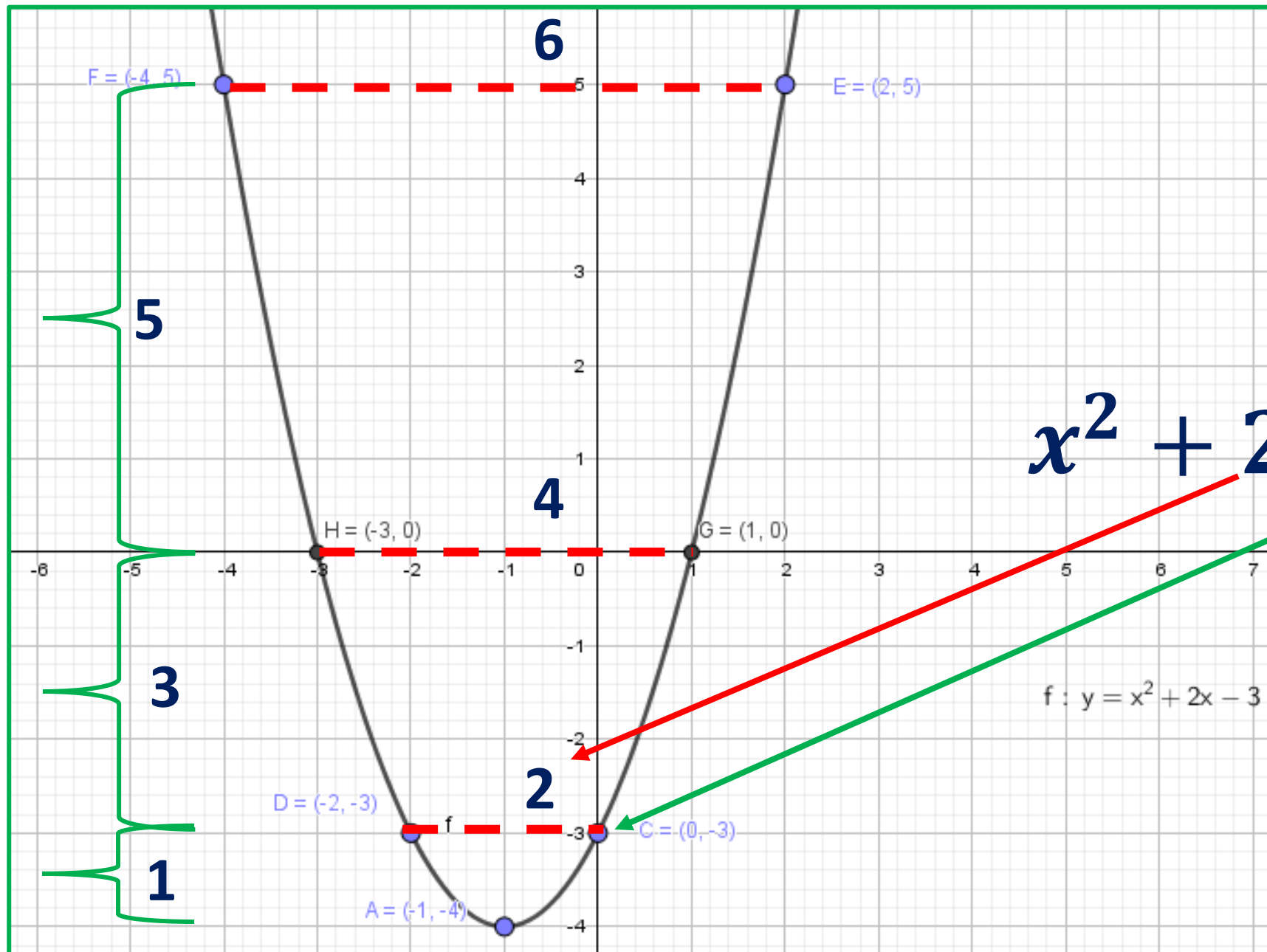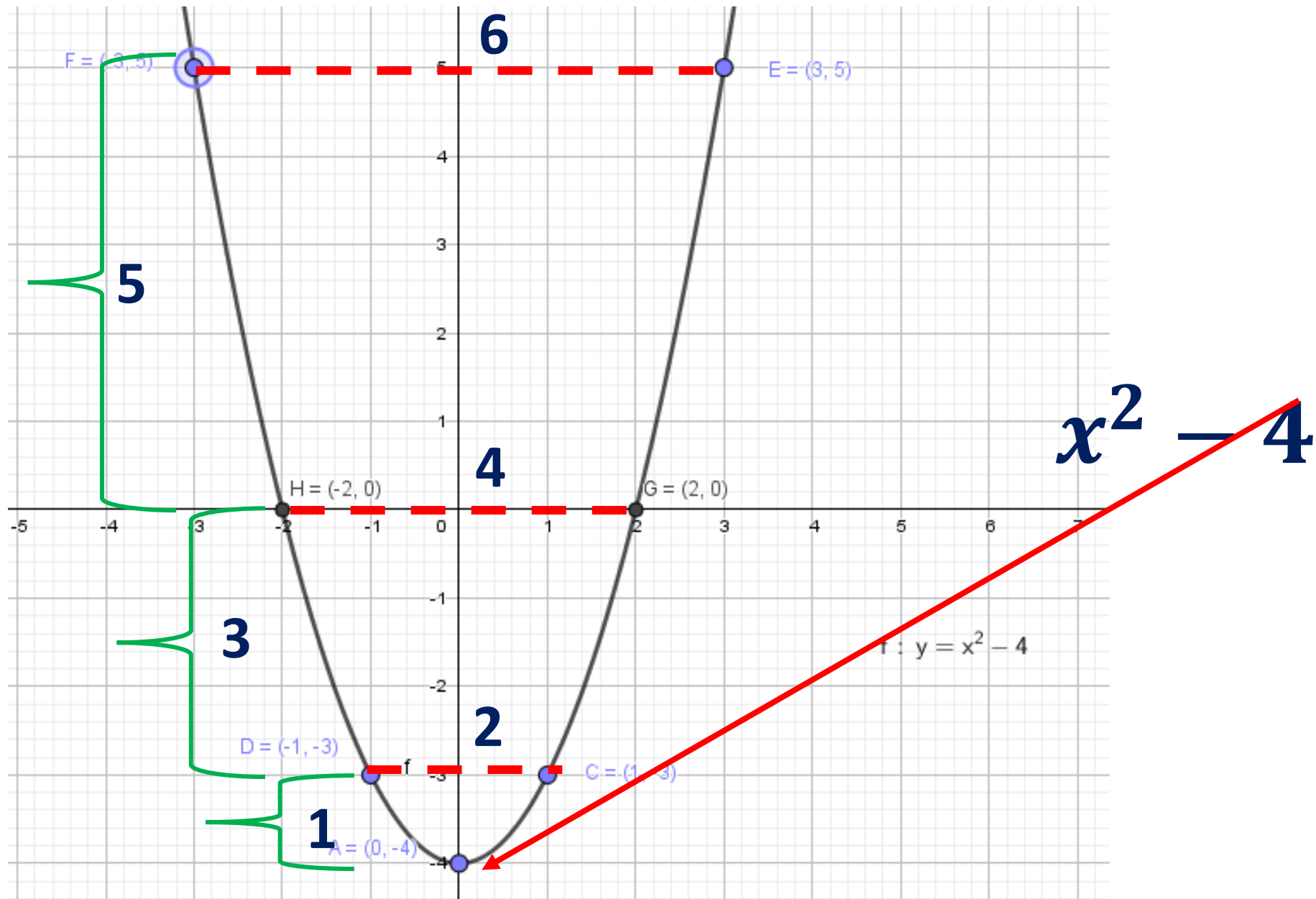
POINTS TO REMEMBER :

VISUALISE THE GRAPH

WRITE AND CHOOSE APPROPRIATE SCALE

DON'T USE 5 IN SCALE

WRITE SOLUTIONS AND ALSO WITH UNITS

CONCENTRATE MORE ON PROBLEMS WITHOUT TABLE

SCORING KEY :

SCALE	- 1
X & Y AXIS	- 1
MINIMUM 5 POINTS	- 3
PLOTTING & DRAWING	- 2
SOLUTION	- 1

SCALE

IN X AXIS 1 CM =1 UNIT

IN Y AXIS 1 CM = 1UNIT

X AXIS   FROM -7 TO +7

Y AXIS   FROM -13 TO +13

CO OEFFICIENT OF X	X VALUES FROM	TO
0, +ve	-3	+3
-ve	0	6
constant 12	-4	+4

$$x^2 - 9 = 0$$

$$x^2 + x - 12 = 0$$

x	-3	-2	-1	0	1	2	3
x^2	9	4	1	0	1	4	9
-9	-9	-9	-9	-9	-9	-9	-9
y	0	-5	-8	-9	-8	-5	0

x	-4	-3	-2	-1	0	1	2	3	4
x^2	16	9	4	1	0	1	4	9	16
x	-4	-3	-2	-1	0	1	2	3	4
-12	-12	-12	-12	-12	-12	-12	-12	-12	-12
y	0	-6	-10	-12	-12	-10	-6	0	8

$$x^2 - 4x + 4 = 0$$

x	0	1	2	3	4	5	6
x^2	0	1	4	9	16	25	36
-4x	0	-4	-8	-12	-16	-20	-24
4	4	4	4	4	4	4	4
y	4	1	0	1	4	9	16

OTHER RESOURCES

COMPULSORY QUESTIONS-PUBLIC EXAMS

Find the equation of the line passing through (22, −6) and having intercept on x-axis exceeds the intercept on y-axis by 5.

x-வெட்டுத்துண்டானது y-வெட்டுத்துண்டின் அளவை விட 5 அலகுகள் அதிகமாகக் கொண்ட ஒரு நேர்க்கோடானது (22, −6) என்ற புள்ளி வழிச் செல்கின்றது எனில், அக்கோட்டின் சமன்பாட்டைக் காண்க.

<u>Old text book</u>

A straight line cuts the coordinate axes at A and B. If the midpoint of AB is (3, 2), then find the equation of AB.

ஒரு நேர்க்கோடு ஆயஅச்சுகளை A மற்றும் B ஆகிய புள்ளிகளில் வெட்டுகின்றது. AB-ன் நடுப்புள்ளி (3, 2) எனில், AB-ன் சமன்பாட்டைக் காண்க.

<u>Old text book</u>

Question

If the quadratic equation $(1 + m^2)x^2 + 2mcx + c^2 − a^2 = 0$ has equal roots, prove that $c^2 = a^2(1 + m^2)$.

<u>CBSE</u>

10th MATHS QUESTION ANALYSIS

2 MARKS

UNIT	DMQ	PTA-1	PTA-2	PTA-3	PTA-4	PTA-5	PTA-6	SEP.19	SEP.21	MAY.22	AUG.22
I RELATIONS & FUNCTIONS	Defn. Ex.1.5 – 1(iv)	Eg.1.7 Ex.1.1-1	Created Ex1.5- 4	Eg.1.15(ii)	Eg.1.22 Created	Created Ex.1.2 - 3	Eg.1.17 Created	Eg.1.2 Ex.1.4- 5	Eg 1.1 Ex.1.2 -2	Ex.1.1 -2 Eg 1.5	**Eg 1.2** Ex.1.1 -4
II NUMBERS & SEQUENCES	Eg.2.15 Ex.2.5 – 4 Created	Ex.2.1 -2 Ex.2.5-6 **_Created_**	Ex.2.7 – 4 Eg.2.58 Created	Eg.2.9 Ex.2.5 – 8 Created	Ex.2.5 – 10 Created	**Ex.2.5 -8** Eg.2.41(i) Created	Created Eg.2.16 Eg.2.55-(iii)	Ex.2.2 - 2 Created Created	Eg 2.26 **Ex.2.5 - 8**	Ex.2.2 - 4 Ex.2.5 - 5	Ex.2.2 - 9 **Ex.2.5 -4**
III ALGEBRA	Ex.3.5 – 1(i) Ex.3.6 – 7 Ex.3.17 – 7(i)	Eg.3.28 Eg.3.36 Ex.3.19-2	Ex.3.5 – 5 Ex.3.17 – 5	Ex.3.5 – 4 Ex.3.14 – 6 Eg.3.63	Ex.3.6 – 4 Ex.3.9 –1(iii) **_Created_**	Eg.3.19 (ii) Ex.3.18-4(ii) **_Created_**	Eg.3.26 Ex.3.12 – 1 Ex.3.14 – 4	**Ex.3.17 - 5** Created	Ex.3.9 - 1(i) Ex.3.13 - 1(i)	Eg 3.14(ii) **_Created_**	Ex.3.7 - 1(i) **_Created_**
IV GEOMETRY	Eg.4.22	Eg.4.1	Eg.4.8	Eg.4.16	Theorem.5 (P) Eg.4.14	Eg.4.15	**_Created_**	Ex.4.2 - 8(i)	Ex.4.2 - 1(i)	**Eg 4.15**	Ex.4.2 -2
V COORDINATE GEOMETRY	**_Created_**	Created	Ex.5.2 – 3(ii) Ex.5.3 – 6	Ex.5.2 –2(ii) **_Created_**	Eg.5.2	Eg.5.33	Ex.5.2 - 8	Eg.5.9 - (iii)	Created Eg 5.19 Ex.5.3 - 13(i)	**Eg 5.2** Eg.5.11 Ex.5.3 - 10	Eg.5.3 **Eg 5.11** Ex.5.2 - 3(i)
VI TRIGONO-METRY	Eg.6.5 Eg.6.18(i)	Eg.6.19	Ex.6.2 -1	Eg.6.26	Ex.6.1-5(ii)	Created.	Ex.6.3 – 1	Ex.6.1 - 3(i)	**Ex.6.2 - 1**	**Ex.6.3 -1**	**Ex.6.2 -1**
VII MENSURATION	Ex.7.1 – 8	Eg.7.19	Ex.7.1 -7 **_Created_**	Eg.7.30	Ex.7.2 - 6	Eg.7.23	Ex.7.2 – 8	Eg.7.8 Eg.7.10 **_Created_**	Eg 7.15 **_Created_**	Eg 7.9 **Ex.7.2 - 6**	Eg 7.6 Ex.7.1 - 1
VIII STATISTICS & PROBABILITY	Ex.8.2 – 1	Ex.8.4-1 Created	Ex.8.4 – 3	Ex.8.3 – 3 Eg.8.15	Eg.8.3 Ex.8.3 – 2	Eg.8.2 Ex.8.3-8 (P)	Ex.8.1 –7 Eg.8.32	Ex.8.1 - 1(i)	Eg 8.23	Eg 8.20	Ex 8.3 -9(P)
SUMMARY Exercise Qns	7	5	9	5	6	4	6	6	7	6	9
Example Qns	5	6	2	7	5	6	5	4	5	7	4
Total Created	2	3	3	2	3	4	3	4	2	1	1
Repeated Qns	-	-	-	-	-	1	-	1	2	4	4

78

10th MATHS QUESTION ANALYSIS

5 MARKS

UNIT		DMQ	PTA-1	PTA-2	PTA-3	PTA-4	PTA-5	PTA-6	SEP.19	SEP.21	MAY.22	AUG.22
I	RELATIONS & FUNCTIONS	Eg.1.15 Ex.1.4–2	Ex.1.1–7(ii) Ex.1.4-12	Ex.1.1–6(i) Ex.1.5–8(iii)	Eg.1.11 Ex.1.4–11 Created	Ex.1.3–10 Ex.1.4-10-ii,iv	Ex.1.1–6(ii) Eg.1.23	Ex.1.5–7 Unit Ex.I.10 (P)	Ex.1.1-7(i) Eg 1.11	Ex.1.1 - 6(ii)	Ex.1.1 - 7(ii)	Ex.1.2 - 4(ii)
II	NUMBERS & SEQUENCES	Ex.2.5–12 Eg.2.39	Ex.2.8–10 Ex.2.9-6	Eg.2.13(i) Eg.2.38	Ex.2.8–7 Created	Eg.2.51 Unit.Ex.II-8	Ex.2.6–9 Ex.2.9-1(vi)	Ex.2.7–10 Created	Created	Eg 2.6 Ex.2.5 -11	Eg.2.28 Ex.2.5 - 12	Ex.2.1 - 7 Ex.2.5 - 7
III	ALGEBRA	Ex.3.8–3(i) Eg.3.46(ii) Created **Created	Eg.3.8 Eg.3.72 Created **Created	Ex.3.1–3 Ex.3.19–8 Created **Created	Eg.3.22 Ex.3.11-1(ii) Ex.3.19–12 **Created	Ex.3.8–2(i) Ex.3.12–4 Ex.3.18–7 **Created	Ex.3.1 -1(i) Eg.3.22 Created **Created	Ex.3.3–2(i) Ex.3.13–5 Created **Created	Ex.3.2 - 1(i) Eg 3.73 Created	Ex.3.1 -1(i) Eg 3.21 Created	Ex.3.8 - 3(i) Ex.3.14 - 4 Eg.3.35	Ex.3.5 - 3(ii) Ex.3.8 -1(i) Eg.3.32
IV	GEOMETRY	Eg.4.21 **Eg.4.25	Theorem.5 **Created	Theorem-1 **Ex.4.2 - 9	Ex.4.3–5 **Theorem.4	Theorem.6 **Ex.4.4 - 9	Theorem.3 **Ex.4.1 - 9	**Ex.4.1–4 Ex.4.3–7	Theorem.3	Theorem.5 Eg 4.32	Theorem.1 Eg.4.23	Theorem.3 Ex.4.3 - 1
V	COORDINATE GEOMETRY	Ex.5.3-14(i)	Unit.Ex.V.2	Ex.5.1–9	Ex.5.4–11	Ex.5.2–9(i)	Ex.5.1-6	Ex.5.3–9	Ex.5.1 - 6 Created	Eg 5.4 Ex 5.3 -9 (P)	Ex.5.2 - 13 Created	Eg 5.6 Ex.5.3 - 8
VI	TRIGONOMETRY	Ex.6.3–3	Eg.6.29	Created	Ex.6.1-7 (ii)	Created	Eg.6.21	Eg.6.13	Ex.6.3 - 3	Eg 6.21	Eg 6.22	Ex 6.2 - 3
VII	MENSURATION	Eg.7.22 Created	Unit Ex.7 - 5 Eg.7.27	Unit Ex.7 -10	Created	Created	Eg.7.31 Created	Eg.7.31	Ex.7.2 -2	Eg 7.23 Eg 7.24	Ex.7.2 -10 Ex.7.3 -2	Eg 7.1 Eg 7.2 - 3
VIII	STATISTICS & PROBABILITY	Ex.8.2–5 Created	Eg.8.12 Eg.8.31	Ex.8.4–12	Eg.8.30 Created	Eg.8.31	Ex.8.1–13 Created	Eg.8.16 Ex.8.4 – 12 Created	Ex.8.3 - 7 Created	Eg. 8.19	Eg.8.31	Ex.8.3 - 7
SUMMARY	Exercise Qns	6	6	7	7	7	6	8	6	4	7	9
	Example Qns	5	7	3	3	3	5	3	3	9	6	5
	Total Created	3	1	2	4	2	3	3	4	1	1	-
	Repeated Qns	-	-	-	-	1	-	1	4	6	5	2

TIME MANAGEMENT

PRESENTATION