

Marking Scheme
Strictly Confidential
(For Internal and Restricted use only)
Secondary School Supplementary Examination, 2025
MATHEMATICS (Standard) (Q.P. CODE 30(B)/S)

General Instructions: -

1.	You are aware that evaluation is the most important process in the actual and correct assessment of the candidates. A small mistake in evaluation may lead to serious problems which may affect the future of the candidates, education system and teaching profession. To avoid mistakes, it is requested that before starting evaluation, you must read and understand the spot evaluation guidelines carefully.
2.	“Evaluation policy is a confidential policy as it is related to the confidentiality of the examinations conducted, Evaluation done and several other aspects. It’s leakage to public in any manner could lead to derailment of the examination system and affect the life and future of millions of candidates. Sharing this policy/document to anyone, publishing in any magazine and printing in News Paper/Website etc. may invite action under various rules of the Board and IPC.”
3.	Evaluation is to be done as per instructions provided in the Marking Scheme. It should not be done according to one’s own interpretation or any other consideration. Marking Scheme should be strictly adhered to and religiously followed. However, while evaluating, answers which are based on latest information or knowledge and/or are innovative, they may be assessed for their correctness otherwise and due marks be awarded to them. In class-X, while evaluating the competency-based questions, please try to understand given answer and even if reply is not from Marking Scheme but correct competency is enumerated by the candidate, due marks should be awarded.
4.	The Marking scheme carries only suggested value points for the answers. These are in the nature of Guidelines only and do not constitute the complete answer. The students can have their own expression and if the expression is correct, the due marks should be awarded accordingly.
5.	The Head-Examiner must go through the first five answer books evaluated by each evaluator on the first day, to ensure that evaluation has been carried out as per the instructions given in the Marking Scheme. If there is any variation, the same should be zero after deliberation and discussion. The remaining answer books meant for evaluation shall be given only after ensuring that there is no significant variation in the marking of individual evaluators.
6.	Evaluators will mark (✓) wherever answer is correct. For wrong answer CROSS ‘X’ be marked. Evaluators will not put right (✓) while evaluating which gives an impression that answer is correct and no marks are awarded. This is most common mistake which evaluators are committing.
7.	If a question has parts, please award marks on the right-hand side for each part. Marks awarded for different parts of the question should then be totalled up and written on the left-hand margin and encircled. This may be followed strictly.
8.	If a question does not have any parts, marks must be awarded on the left-hand margin and encircled. This may also be followed strictly.

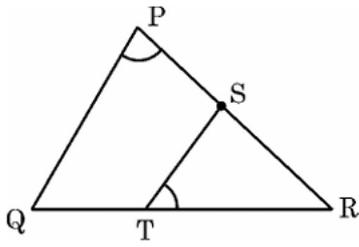
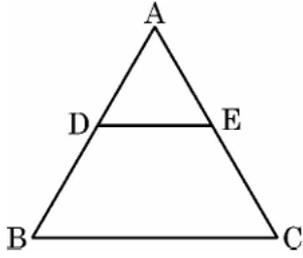
9.	If a student has attempted an extra question, answer of the question deserving more marks should be retained and the other answer scored out with a note “Extra Question”.
10.	No marks to be deducted for the cumulative effect of an error. It should be penalized only once.
11.	A full scale of marks _____ (example 0 to 80/70/60/50/40/30 marks as given in Question Paper) has to be used. Please do not hesitate to award full marks if the answer deserves it.
12.	Every examiner has to necessarily do evaluation work for full working hours i.e., 8 hours every day and evaluate 20 answer books per day in main subjects and 25 answer books per day in other subjects (Details are given in Spot Guidelines). This is in view of the reduced syllabus and number of questions in question paper.
13.	Ensure that you do not make the following common types of errors committed by the Examiner in the past:- <ul style="list-style-type: none"> ● Leaving answer or part thereof unassessed in an answer book. ● Giving more marks for an answer than assigned to it. ● Wrong totalling of marks awarded to an answer. ● Wrong transfer of marks from the inside pages of the answer book to the title page. ● Wrong question wise totalling on the title page. ● Wrong totalling of marks of the two columns on the title page. ● Wrong grand total. ● Marks in words and figures not tallying/not same. ● Wrong transfer of marks from the answer book to online award list. ● Answers marked as correct, but marks not awarded. (Ensure that the right tick mark is correctly and clearly indicated. It should merely be a line. Same is with the X for incorrect answer.) Half or a part of answer marked correct and the rest as wrong, but no marks awarded.
14.	While evaluating the answer books if the answer is found to be totally incorrect, it should be marked as cross (X) and awarded zero (0) Marks.
15.	Any un assessed portion, non-carrying over of marks to the title page, or totaling error detected by the candidate shall damage the prestige of all the personnel engaged in the evaluation work as also of the Board. Hence, in order to uphold the prestige of all concerned, it is again reiterated that the instructions be followed meticulously and judiciously.
16.	The Examiners should acquaint themselves with the guidelines given in the “ Guidelines for spot Evaluation ” before starting the actual evaluation.
17.	Every Examiner shall also ensure that all the answers are evaluated, marks carried over to the title page, correctly totalled and written in figures and words.
18.	The candidates are entitled to obtain photocopy of the Answer Book on request on payment of the prescribed processing fee. All Examiners/Additional Head Examiners/Head Examiners are once again reminded that they must ensure that evaluation is carried out strictly as per value points for each answer as given in the Marking Scheme.

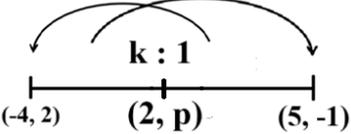
MARKING SCHEME
MATHEMATICS (Subject Code–041)
(PAPER CODE: 30(B)/S)

Q. No.	EXPECTED OUTCOMES/VALUE POINTS	Marks
SECTION A		
This section has 20 Multiple Choice Questions (MCQs) carrying 1 mark each.		
1.	The ratio of the HCF to the LCM of 7, 21 and 28 is : (A) 1 : 4 (B) 3 : 4 (C) 1 : 8 (D) 1 : 12	
Sol.	(D) 1 : 12	1
2.	$2\sqrt{35}$ is : (A) an integer (B) a rational number (C) an irrational number (D) a natural number	
Sol.	(B) a rational number	1
3.	If one zero of the quadratic polynomial $4x^2 + 4x - m$ is $\frac{3}{2}$, then the other zero is : (A) $\frac{2}{5}$ (B) $\frac{5}{2}$ (C) $-\frac{5}{2}$ (D) $-\frac{1}{2}$	
Sol.	(C) $-\frac{5}{2}$	1
4.	The zeroes of the quadratic polynomial $x^2 + 99x + 127$ are : (A) both positive (B) both negative (C) one positive and one negative (D) both equal	
Sol.	(B) both negative	1

5.	A quadratic polynomial whose one zero is 3 and the product of zeroes is 0, is : (A) $x^2 - 3$ (B) $x^2 - 9$ (C) $x^2 + 3x$ (D) $x^2 - 3x$	
Sol.	(D) $x^2 - 3x$	1
6.	Graphically, the pair of equations $8x - 4y + 12 = 0$ and $2x - y + 5 = 0$ represents two lines which are : (A) intersecting at exactly one point (B) intersecting at exactly two points (C) parallel (D) coincident	
Sol.	(C) parallel	1
7.	The line represented by $2y - x = 4$ intersects the y-axis at : (A) (2, 0) (B) (0, -4) (C) (0, 2) (D) (2, 2)	
Sol.	(C) (0, 2)	1
8.	Value(s) of k for which the quadratic equation $2x^2 - kx + k = 0$ has equal roots is/are : (A) 0 only (B) 0, 4 (C) 8 only (D) 0, 8	
Sol.	(D) 0, 8	1
9.	If one root of the quadratic equation $3x^2 - 9x + k - 1 = 0$ is reciprocal of the other, then the value of k is : (A) 4 (B) -4 (C) -2 (D) 3	
Sol.	(A) 4	1
10.	The 21 st term of an AP, whose first two terms are -3 and 4 respectively, is : (A) 17 (B) 143 (C) 137 (D) 153	
Sol.	(C) 137	1

11.	The 5 th term from the end of an AP $- 11, - 8, - 5, \dots, 55$ is : (A) 1 (B) 43 (C) 40 (D) 46	
Sol.	(B) 43	1
12.	If the points A(5, 4) and B(x, 6) are on a circle with centre (3, 4), then the value of x is : (A) 6 (B) 7 (C) 3 (D) 1	
Sol.	(C) 3	1
13.	The perimeters of two similar triangles are 25 cm and 15 cm respectively. If one side of the first triangle is 9 cm, then the length of the corresponding side of the second triangle is : (A) 5.4 cm (B) 6.8 cm (C) 2.5 cm (D) 4 cm	
Sol.	(A) 5.4 cm	1
14.	ABCD is a trapezium with $AB \parallel DC$ and the diagonals intersect at O. If $AO = (2x + 1)$ cm, $OC = (5x - 7)$ cm, $DO = (7x - 5)$ cm and $OB = (7x + 1)$ cm, then the value of x is : (A) 2 (B) 3 (C) 4 (D) 1	
Sol.	(A) 2	1
15.	If the radii of two concentric circles are 4 cm and 5 cm, then the length of each chord of one circle which is tangent to the other circle is : (A) 3 cm (B) 1 cm (C) 6 cm (D) 9 cm	
Sol.	(C) 6 cm	1
16.	If $\sin \theta + \sin^2 \theta = 1$, then the value of $\cos^2 \theta + \cos^4 \theta$ is : (A) 1 (B) $\frac{1}{2}$ (C) 2 (D) 3	
Sol.	(A) 1	1

SECTION B		
This section has 5 Very Short Answer (VSA) type questions carrying 2 marks each.		
21 (a)	S and T are points on sides PR and QR of ΔPQR such that $\angle P = \angle RTS$. Show that $\Delta RPQ \sim \Delta RTS$.	
Sol.	 <p>In ΔRPQ and ΔRTS, $\angle P = \angle RTS$ $\angle PRT = \angle SRT$ $\therefore \Delta RPQ \sim \Delta RTS$</p>	$\frac{1}{2}$ $\frac{1}{2}$ 1
OR		
21 (b)	If a line intersects sides AB and AC of ΔABC at D and E respectively, and is parallel to BC, prove that $\frac{AD}{AB} = \frac{AE}{AC}$.	
Sol.	 <p>$\Delta ADE \sim \Delta ABC$ $\therefore \frac{AD}{AB} = \frac{AE}{AC}$</p>	1 1
22 (a)	From a pack of 52 playing cards, jack, queen and king of diamonds are removed. A card is drawn at random from the remaining cards. Find the probability of getting a face card or a card of spades.	
Sol.	Number of cards after removing jack, queen and king of diamonds = $52 - 3 = 49$ Favourable outcomes = 19 $P(\text{getting a face card or a card of spades}) = \frac{19}{49}$	1 1
OR		
22 (b)	Three different coins are tossed together. Find the probability of getting at least two tails.	
Sol.	Total number of possible outcomes = 8 $P(\text{at least two tails}) = \frac{4}{8}$ or $\frac{1}{2}$	1 1

23.	Find the value(s) of k for which the pair of linear equations $kx + y = k^2$; $x + ky = 1$ have infinitely many solutions.	
Sol.	For infinitely many solutions $\frac{k}{1} = \frac{1}{k} = \frac{k^2}{1}$ $\Rightarrow k^2 = 1 \text{ and } k^3 = 1$ $\Rightarrow k = \pm 1 \text{ and } k = 1$ $\therefore k = 1$	$\frac{1}{2}$ 1 $\frac{1}{2}$
24.	Show that the points (a, a) , $(-a, -a)$ and $(-\sqrt{3}a, \sqrt{3}a)$ are the vertices of an equilateral triangle.	
Sol.	Let A (a, a) , B $(-a, -a)$ and C $(-\sqrt{3}a, \sqrt{3}a)$ be the given points. $AB = \sqrt{(-a - a)^2 + (-a - a)^2} = \sqrt{8a^2}$ or $2\sqrt{2} a$ $BC = \sqrt{(-\sqrt{3}a + a)^2 + (\sqrt{3}a + a)^2} = \sqrt{8a^2}$ or $2\sqrt{2} a$ $CA = \sqrt{(-\sqrt{3}a - a)^2 + (\sqrt{3}a - a)^2} = \sqrt{8a^2}$ or $2\sqrt{2} a$ Since $AB = BC = CA$ Therefore, ΔABC is an equilateral triangle.	$\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$
25.	If $1 + \sin^2 \theta = 3 \sin \theta \cos \theta$, then prove that $\tan \theta = 1$ or $\frac{1}{2}$.	
Sol.	$1 + \sin^2 \theta = 3 \sin \theta \cos \theta$ $\Rightarrow (\sin^2 \theta + \cos^2 \theta) + \sin^2 \theta - 3 \sin \theta \cos \theta = 0$ $\Rightarrow 2 \sin^2 \theta + \cos^2 \theta - 3 \sin \theta \cos \theta = 0$ Dividing by $\cos^2 \theta$, we get $2 \tan^2 \theta - 3 \tan \theta + 1 = 0$ $\Rightarrow (2 \tan \theta - 1)(\tan \theta - 1) = 0$ $\Rightarrow \tan \theta = \frac{1}{2}$ or 1	$\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$
SECTION C		
This section has 6 Short Answer (SA) type questions carrying 3 marks each.		
26 (a)	In what ratio does the point $(2, p)$ divide the line segment joining the points $(-4, 2)$ and $(5, -1)$? Also, find the value of 'p'.	
Sol.	 <p>Let the ratio be $k : 1$ $\Rightarrow 2 = \frac{5k - 4}{k + 1}$ $\Rightarrow k = 2$ \therefore required ratio is $2 : 1$ Now, $p = \frac{2(-1) + 1(2)}{2 + 1} = 0$</p>	1 $\frac{1}{2}$ $\frac{1}{2}$ 1
OR		

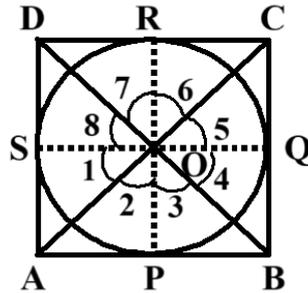
	Solving ① and ②, we get $x = 200$ \therefore monthly income of two persons are ₹ 2200 and ₹ 1400	$\frac{1}{2}$ $\frac{1}{2} + \frac{1}{2}$																																
29.	Solve the following equation for x : $\frac{1}{x+4} - \frac{1}{x-7} = \frac{11}{30}; x \neq -4, 7$																																	
Sol.	$\frac{1}{x+4} - \frac{1}{x-7} = \frac{11}{30}$ $\Rightarrow x^2 - 3x + 2 = 0$ $\Rightarrow (x-2)(x-1) = 0$ $\Rightarrow x = 1, 2$	1 1 1																																
30.	The sum of the third and seventh terms of an AP is 40 and the sum of its sixth and fourteenth terms is 70. Find the sum of the first ten terms of the AP.																																	
Sol.	$a_3 + a_7 = 40$ $\Rightarrow (a + 2d) + (a + 6d) = 40$ $\Rightarrow 2a + 8d = 40$ or $a + 4d = 20$ --- ① $a_6 + a_{14} = 70$ $\Rightarrow (a + 5d) + (a + 13d) = 70$ $\Rightarrow 2a + 18d = 70$ or $a + 9d = 35$ --- ② Solving ① and ②, we get $a = 8$ and $d = 3$ $S_{10} = \frac{10}{2} \times [2(8) + 9(3)]$ $= 215$	$\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2} + \frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$																																
31.	The mean of the following frequency distribution is 62.8. Determine the values of f_1 and f_2 .																																	
	<table border="1"> <thead> <tr> <th>Class :</th> <th>0 – 20</th> <th>20 – 40</th> <th>40 – 60</th> <th>60 – 80</th> <th>80 – 100</th> <th>100 – 120</th> <th>Total</th> </tr> </thead> <tbody> <tr> <td>Frequency :</td> <td>5</td> <td>f_1</td> <td>10</td> <td>f_2</td> <td>7</td> <td>8</td> <td>50</td> </tr> </tbody> </table>	Class :	0 – 20	20 – 40	40 – 60	60 – 80	80 – 100	100 – 120	Total	Frequency :	5	f_1	10	f_2	7	8	50																	
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Sol.	<table border="1"> <thead> <tr> <th>Class</th> <th>f_i</th> <th>x_i</th> <th>$f_i x_i$</th> </tr> </thead> <tbody> <tr> <td>0 – 20</td> <td>5</td> <td>10</td> <td>50</td> </tr> <tr> <td>20 – 40</td> <td>f_1</td> <td>30</td> <td>$30f_1$</td> </tr> <tr> <td>40 – 60</td> <td>10</td> <td>50</td> <td>500</td> </tr> <tr> <td>60 – 80</td> <td>f_2</td> <td>70</td> <td>$70f_2$</td> </tr> <tr> <td>80 – 100</td> <td>7</td> <td>90</td> <td>630</td> </tr> <tr> <td>100 – 120</td> <td>8</td> <td>110</td> <td>880</td> </tr> <tr> <td>Total</td> <td>$50 + f_1 + f_2$</td> <td></td> <td>$2060 + 30f_1 + 70f_2$</td> </tr> </tbody> </table> Mean = 62.8 $\therefore \frac{2060 + 30f_1 + 70f_2}{50} = 62.8$ $\Rightarrow 30f_1 + 70f_2 = 1080$ or $3f_1 + 7f_2 = 108$ --- ① Also, $30 + f_1 + f_2 = 50$ $\Rightarrow f_1 + f_2 = 20$ --- ② Solving ① and ②, we get $f_1 = 8$ and $f_2 = 12$	Class	f_i	x_i	$f_i x_i$	0 – 20	5	10	50	20 – 40	f_1	30	$30f_1$	40 – 60	10	50	500	60 – 80	f_2	70	$70f_2$	80 – 100	7	90	630	100 – 120	8	110	880	Total	$50 + f_1 + f_2$		$2060 + 30f_1 + 70f_2$	Correct table 1 1 $\frac{1}{2}$ $\frac{1}{2}$
Class	f_i	x_i	$f_i x_i$																															
0 – 20	5	10	50																															
20 – 40	f_1	30	$30f_1$																															
40 – 60	10	50	500																															
60 – 80	f_2	70	$70f_2$																															
80 – 100	7	90	630																															
100 – 120	8	110	880																															
Total	$50 + f_1 + f_2$		$2060 + 30f_1 + 70f_2$																															

SECTION D

This section has 4 Long Answer (LA) type questions carrying 5 marks each.

32 (a) Prove that the opposite sides of a quadrilateral circumscribing a circle subtend supplementary angles at the centre of the circle.

Sol.



$$\Delta OPA \cong \Delta OSA$$

$$\Rightarrow \angle 1 = \angle 2$$

$$\text{Similarly, } \angle 3 = \angle 4, \angle 5 = \angle 6, \angle 7 = \angle 8$$

$$\text{Now, } \angle 1 + \angle 2 + \angle 3 + \angle 4 + \angle 5 + \angle 6 + \angle 7 + \angle 8 = 360^\circ$$

$$\Rightarrow 2(\angle 1 + \angle 4 + \angle 5 + \angle 8) = 360^\circ$$

$$\Rightarrow (\angle 1 + \angle 8) + (\angle 4 + \angle 5) = 180^\circ$$

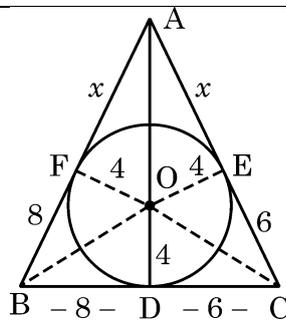
$$\Rightarrow \angle AOD + \angle BOC = 180^\circ$$

1
1
1
1
1

OR

32 (b) A triangle ABC is drawn to circumscribe a circle of radius 4 cm such that the segments BD and DC into which BC is divided by the point of contact D are of lengths 8 cm and 6 cm respectively. Find the lengths of sides AB and AC.

Sol.



$$\text{Area } (\Delta ABC) = \text{Area } (\Delta BOC) + \text{Area } (\Delta AOC) + \text{Area } (\Delta AOB)$$

$$= \frac{1}{2} \times 4 \times 14 + \frac{1}{2} \times 4 \times (6 + x) + \frac{1}{2} \times 4 \times (8 + x)$$

$$= (56 + 4x) \text{ or } 4(14 + x) \quad \text{--- (1)}$$

$$\text{Semi perimeter of } \Delta ABC = \frac{14 + (6+x) + (8+x)}{2} = (14 + x)$$

$$\text{Also, area } (\Delta ABC) = \sqrt{(14 + x)(14 + x - 14)[(14 + x) - (6 + x)][(14 + x) - (8 + x)]}$$

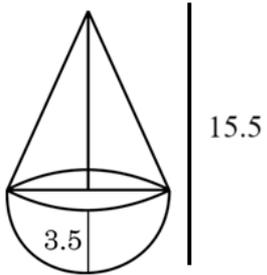
$$= \sqrt{48x(14 + x)} \quad \text{--- (2)}$$

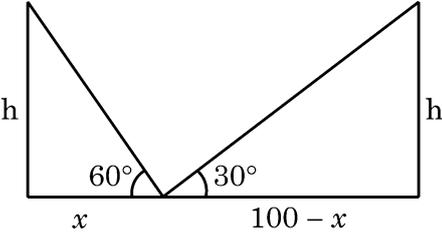
From (1) and (2), we get

$$x = 7$$

$$\therefore AB = 15 \text{ cm and } AC = 13 \text{ cm}$$

1
1
½
1
½
1

33 (a)	A spherical glass vessel has a cylindrical neck 8 cm long, 2 cm in diameter; the diameter of the spherical part is 8.5 cm. Find the amount of water it can hold, when it is full up to the top. Also, find its external curved surface area. [Use $\pi = 3.14$]	
Sol.	<p>Radius of cylindrical neck = 1 cm</p> <p>Radius of spherical part = $\frac{8.5}{2}$ or $\frac{85}{20}$ cm</p> <p>Amount of water hold by vessel = Volume of spherical part + Volume of cylindrical part</p> $= \frac{4}{3} \times 3.14 \times \left(\frac{85}{20}\right)^3 + 3.14 \times (1)^2 \times 8$ $= 346.51 \text{ cm}^3 \text{ approx.}$ <p>External CSA = CSA of spherical part + CSA of cylindrical part</p> $= 4 \times 3.14 \times \left(\frac{85}{20}\right)^2 + 2 \times 3.14 \times 1 \times 8$ $= 277.11 \text{ cm}^2 \text{ approx.}$	<p>$\frac{1}{2}$</p> <p>$\frac{1}{2}$</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p>
OR		
33 (b)	A toy is in the form of a cone of radius 3.5 cm, mounted on a hemisphere of same radius. The total height of the toy is 15.5 cm. Find the total surface area of the toy.	
Sol.	<div style="text-align: center;">  </div> <p>Height of conical part = $15.5 - 3.5 = 12$ cm</p> <p>Slant height = $\sqrt{(3.5)^2 + (12)^2} = 12.5$ cm</p> <p>Total surface area of toy = CSA of conical part + CSA of hemispherical part</p> $= \frac{22}{7} \times 3.5 \times 12.5 + 2 \times \frac{22}{7} \times (3.5)^2$ $= 214.5 \text{ cm}^2$	<p>1</p> <p>1</p> <p>1 + 1</p> <p>1</p>

34.	Two poles of equal height are standing opposite to each other, on either side of a road, which is 100 m wide. From a point between them on the road, the angles of elevation of the top of the poles are 60° and 30° respectively. Find the height of the poles.																									
Sol.	 <p>Let 'h' be the height of pole.</p> $\frac{h}{x} = \tan 60^\circ = \sqrt{3}$ $\Rightarrow h = \sqrt{3}x \quad \text{--- (1)}$ <p>Also, $\frac{h}{100-x} = \tan 30^\circ = \frac{1}{\sqrt{3}}$</p> $\Rightarrow h = \frac{100-x}{\sqrt{3}} \quad \text{--- (2)}$ <p>From (1) and (2), we get $x = 25$</p> <p>Hence, $h = 25\sqrt{3}$ m</p>	<p>1</p> <p>$\frac{1}{2}$</p> <p>1</p> <p>1</p> <p>$\frac{1}{2}$</p>																								
35.	<p>The median of the following frequency distribution is 35. Find the value of x and hence find the mode.</p> <table border="1" data-bbox="236 1048 1150 1151"> <tbody> <tr> <td>Class :</td> <td>0 – 10</td> <td>10 – 20</td> <td>20 – 30</td> <td>30 – 40</td> <td>40 – 50</td> <td>50 – 60</td> <td>60 – 70</td> </tr> <tr> <td>Frequency :</td> <td>2</td> <td>3</td> <td>x</td> <td>6</td> <td>5</td> <td>3</td> <td>2</td> </tr> </tbody> </table>	Class :	0 – 10	10 – 20	20 – 30	30 – 40	40 – 50	50 – 60	60 – 70	Frequency :	2	3	x	6	5	3	2									
Class :	0 – 10	10 – 20	20 – 30	30 – 40	40 – 50	50 – 60	60 – 70																			
Frequency :	2	3	x	6	5	3	2																			
Sol.	<table border="1" data-bbox="228 1218 1394 1568"> <thead> <tr> <th>Class</th> <th>Frequency</th> <th>cf</th> </tr> </thead> <tbody> <tr> <td>0 – 10</td> <td>2</td> <td>2</td> </tr> <tr> <td>10 – 20</td> <td>3</td> <td>5</td> </tr> <tr> <td>20 – 30</td> <td>x</td> <td>5 + x</td> </tr> <tr> <td>30 – 40</td> <td>6</td> <td>11 + x</td> </tr> <tr> <td>40 – 50</td> <td>5</td> <td>16 + x</td> </tr> <tr> <td>50 – 60</td> <td>3</td> <td>19 + x</td> </tr> <tr> <td>60 – 70</td> <td>2</td> <td>21 + x</td> </tr> </tbody> </table> <p style="text-align: right;">Correct table</p> <p>Median class is 30 – 40</p> <p>Median = 35</p> $\therefore 30 + \left(\frac{\left(\frac{21+x}{2} \right) - (5+x)}{6} \right) \times 10 = 35$ $\Rightarrow x = 5$ <p>Modal class is 30 – 40</p> $\text{Mode} = 30 + \left(\frac{6-5}{2 \times 6 - 5 - 5} \right) \times 10$ $= 35$	Class	Frequency	cf	0 – 10	2	2	10 – 20	3	5	20 – 30	x	5 + x	30 – 40	6	11 + x	40 – 50	5	16 + x	50 – 60	3	19 + x	60 – 70	2	21 + x	<p>1</p> <p>$\frac{1}{2}$</p> <p>1</p> <p>$\frac{1}{2}$</p> <p>$\frac{1}{2}$</p> <p>1</p> <p>$\frac{1}{2}$</p>
Class	Frequency	cf																								
0 – 10	2	2																								
10 – 20	3	5																								
20 – 30	x	5 + x																								
30 – 40	6	11 + x																								
40 – 50	5	16 + x																								
50 – 60	3	19 + x																								
60 – 70	2	21 + x																								

SECTION E		
This section has 3 case study based questions carrying 4 marks each.		
36.	Case Study – 1 <p>The science department of a college is conducting an international seminar in which the number of participants in Physics, Chemistry and Biology are 65, 91 and 117 respectively. The coordinator has made the arrangement such that in each room, the same number of participants are to be seated with all of them being in the same subject.</p> <p>Based on the information given above, answer the following questions :</p> <p>(i) Find the HCF of 65, 91 and 117.</p> <p>(ii) Find the LCM of 65, 91 and 117.</p> <p>(iii) (a) Find the minimum number of rooms required based on the above conditions.</p> <p style="text-align: center;">OR</p> <p>(iii) (b) Find the minimum number of participants to be accommodated in each of the rooms.</p>	
Sol.	<p>(i) $65 = 5 \times 13 ; 91 = 7 \times 13 ; 117 = 3^2 \times 13$ HCF (65, 91 & 117) = 13</p> <p>(ii) LCM (65, 91 & 117) = $3^2 \times 5 \times 7 \times 13 = 4095$</p> <p>(iii) (a) minimum number of rooms = $\frac{65}{13} + \frac{91}{13} + \frac{117}{13}$ = 21</p> <p style="text-align: center;">OR</p> <p>(b) 1</p>	<p>$\frac{1}{2}$</p> <p>$\frac{1}{2}$</p> <p>1</p> <p>1</p> <p>1</p> <p>2</p>

37.

Case Study - 2

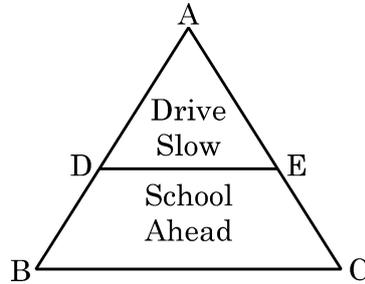
On a road leading to a school, there is a triangle (ABC) shaped board on the road. It is divided into two parts by a line DE, which is parallel to BC. On the upper part, it is written 'DRIVE SLOW' and on the lower part it is written, 'SCHOOL AHEAD'.

Based on the information given above, answer the following questions :

- (i) If $AD = 3$ cm, $BD = 5$ cm and $AE = 4$ cm, then find the length of AC.
- (ii) If $\angle ADE = 50^\circ$ and $\angle DAE = 45^\circ$, then find $\angle ACB$.
- (iii) (a) If $AD = 4$ cm and $BD = 6$ cm, then find $\frac{DE}{BC}$.

OR

- (iii) (b) If $AD = 3$ cm, $BD = 6$ cm and $AE = 5$ cm, then find $\frac{AB}{AC}$.

Sol.

$$(i) \quad \frac{3}{3+5} = \frac{4}{AC}$$

$$\Rightarrow AC = \frac{32}{3} \text{ cm}$$

$$(ii) \quad \angle ACB = \angle AED = 180^\circ - (50^\circ + 45^\circ) = 85^\circ$$

$$(iii) \quad (a) \quad \triangle ADE \sim \triangle ABC$$

$$\therefore \frac{DE}{BC} = \frac{AD}{AB} = \frac{4}{10} \text{ or } \frac{2}{5}$$

OR

$$(b) \quad DE \parallel BC$$

$$\therefore \frac{3}{6} = \frac{5}{EC} \Rightarrow EC = 10$$

$$\frac{AB}{AC} = \frac{3+6}{5+10} = \frac{9}{15} \text{ or } \frac{3}{5}$$

 $\frac{1}{2}$ $\frac{1}{2}$

1

1

1

1

1

38.	<p style="text-align: center;">Case Study – 3</p> <p>Harit has to cut a circular pizza into equal slices such that he and all of his 7 friends get a slice of same size. The pizza is 35 cm in diameter.</p> <p>Based on the information given above, answer the following questions :</p> <p>(i) How many times will Harit have to make a cut along the diameter to make 8 slices ?</p> <p>(ii) What is the radius of each slice ?</p> <p>(iii) (a) Find the area of each slice of pizza.</p> <p style="text-align: center;">OR</p> <p>(iii) (b) Find the area of the entire pizza.</p>	
Sol.	<p>(i) 4 times</p> <p>(ii) Radius = 17.5 cm</p> <p>(iii) (a) Area of each slice = $\frac{45}{360} \times \frac{22}{7} \times (17.5)^2$ = 120.31 cm² approx.</p> <p style="text-align: center;">OR</p> <p>(b) Area of entire pizza = $\frac{22}{7} \times (17.5)^2$ = 962.5 cm²</p>	<p style="text-align: center;">1</p>