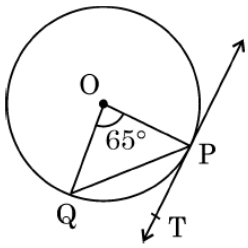
Marking Scheme
Strictly Confidential
(For Internal and Restricted use only)
Secondary School Examination, 2024
MATHEMATICS PAPER CODE 30/2/2

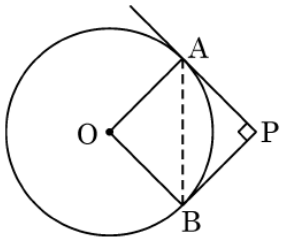
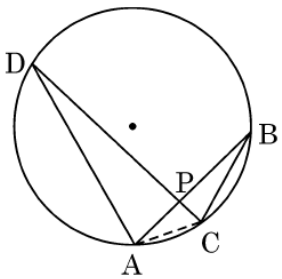
General Instructions: -

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. Its' 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 two 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 in the left-hand margin and encircled. This may be followed strictly.
8	If a question does not have any parts, marks must be awarded in the left-hand margin and encircled. This may also be followed strictly.

9	**<u>In Q1-Q20, if a candidate attempts the question more than once (without canceling the previous attempt), marks shall be awarded for the first attempt only and the other answer scored out with a note "Extra Question".</u>**
10	**<u>In Q21-Q38, 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".</u>**
11	No marks to be deducted for the cumulative effect of an error. It should be penalized only once.
12	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.
13	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.
14	Ensure that you do not make the following common types of errors committed by the Examiner in the past :- ● 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 on 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.
15	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.
16	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.
17	The Examiners should acquaint themselves with the guidelines given in the "**Guidelines for spot Evaluation**" before starting the actual evaluation.
18	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.
19	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.

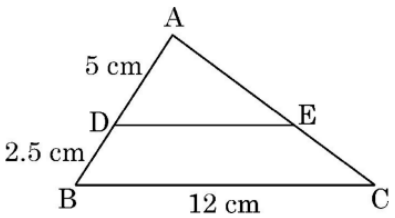
MARKING SCHEME
MATHEMATICS (Subject Code–041)
(PAPER CODE: 30/2/2)

Q. No.	EXPECTED OUTCOMES/VALUE POINTS	Marks
	SECTION A **This section consists of 20 questions of 1 mark each.**	
1.	Which term of the A.P. –29, –26, –23, ..., 61 is 16 ? (A) 11^{th} (B) 16^{th} (C) 10^{th} (D) 31^{st}	
Sol.	(B) 16^{th}	**1**
2.	In the given figure, PT is tangent to a circle with centre O. Chord PQ subtends an angle of 65° at the centre. The measure of ∠QPT is :  (A) 65° (B) 57.5° (C) 67.5° (D) 32.5°	
Sol.	(D) 32.5°	**1**

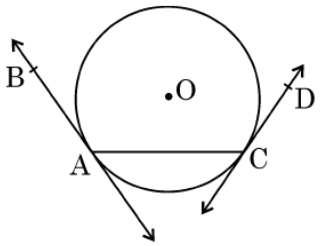
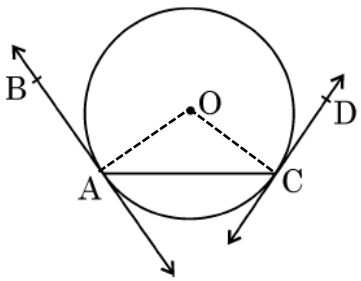
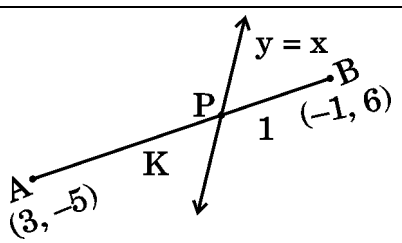
3.	In the given figure, tangents PA and PB to the circle centred at O, from point P are perpendicular to each other. If PA = 5 cm, then length of AB is equal to  (A) 5 cm (B) $5\sqrt{2}$ cm (C) $2\sqrt{5}$ cm (D) 10 cm	
Sol.	(B) $5\sqrt{2}$ cm	**1**
4.	AB and CD are two chords of a circle intersecting at P. Choose the correct statement from the following :  (A) $\Delta ADP \sim \Delta CBA$ (B) $\Delta ADP \sim \Delta BPC$ (C) $\Delta ADP \sim \Delta BCP$ (D) $\Delta ADP \sim \Delta CBP$	
Sol.	(D) $\Delta ADP \sim \Delta CBP$	**1**
5.	If value of each observation in a data is increased by 2, then median of the new data (A) increases by 2 (B) increases by 2n (C) remains same (D) decreases by 2	
Sol.	(A) increases by 2	**1**

6.	If α and β are zeroes of the polynomial $2x^2 - 9x + 5$, then value of $\alpha^2 + \beta^2$ is (A) $\frac{1}{4}$ (B) $\frac{61}{4}$ (C) 1 (D) $\frac{71}{4}$	
Sol.	(B) $\frac{61}{4}$	**1**
7.	After an examination, a teacher wants to know the marks obtained by maximum number of the students in her class. She requires to calculate _____ of marks. (A) median (B) mode (C) mean (D) range	
Sol.	(B) mode	**1**
8.	The value of k for which the system of equations $3x - y + 8 = 0$ and $6x - ky + 16 = 0$ has infinitely many solutions, is (A) -2 (B) 2 (C) $\frac{1}{2}$ (D) $-\frac{1}{2}$	
Sol.	(B) 2	**1**
9.	Point P divides the line segment joining the points A(4, –5) and B(1, 2) in the ratio 5:2. Co-ordinates of point P are (A) $\left(\frac{5}{2}, \frac{-3}{2}\right)$ (B) $\left(\frac{11}{7}, 0\right)$ (C) $\left(\frac{13}{7}, 0\right)$ (D) $\left(0, \frac{13}{7}\right)$	
Sol.	(C) $\left(\frac{13}{7}, 0\right)$	**1**

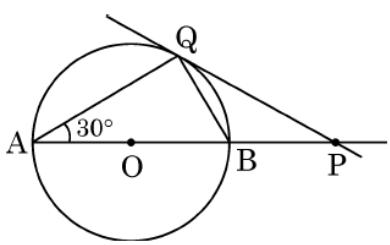
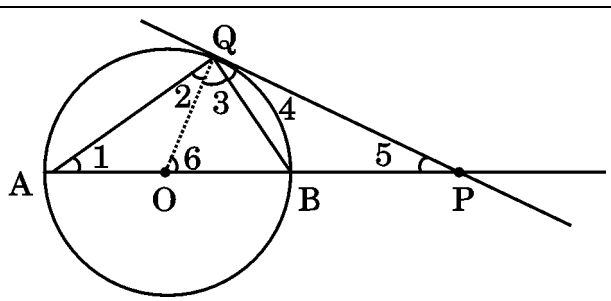
10.	A box contains cards numbered 6 to 55. A card is drawn at random from the box. The probability that the drawn card has a number which is a perfect square, is (A) $\frac{7}{50}$ (B) $\frac{7}{55}$ (C) $\frac{1}{10}$ (D) $\frac{5}{49}$	
Sol.	(C) $\mathbf{\frac{1}{10}}$	**1**
11.	If $\sin\theta = \cos\theta$, $(0° < \theta < 90°)$, then value of $(\sec\theta \cdot \sin\theta)$ is : (A) $\frac{1}{\sqrt{2}}$ (B) $\sqrt{2}$ (C) 1 (D) 0	
Sol.	(C) 1	**1**
12.	Two dice are rolled together. The probability of getting the sum of the two numbers to be more than 10, is (A) $\frac{1}{9}$ (B) $\frac{1}{6}$ (C) $\frac{7}{12}$ (D) $\frac{1}{12}$	
Sol.	(D) $\mathbf{\frac{1}{12}}$	**1**
13.	Value of k for which $x = 2$ is a solution of the equation $5x^2 - 4x + (2 + k) = 0$, is (A) 10 (B) –10 (C) 14 (D) –14	
Sol.	(D) -14	**1**

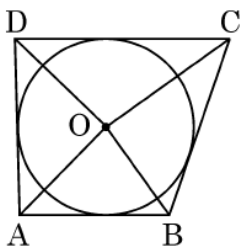
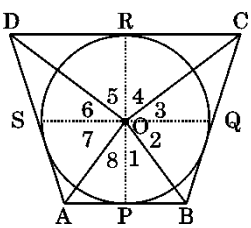
14.	The perimeters of two similar triangles ABC and PQR are 56 cm and 48 cm respectively. PQ/AB is equal to (A) $\frac{7}{8}$ (B) $\frac{6}{7}$ (C) $\frac{7}{6}$ (D) $\frac{8}{7}$	
Sol.	(B) $\frac{6}{7}$	**1**
15.	The sum of first 200 natural numbers is (A) 2010 (B) 2000 (C) 20100 (D) 21000	
Sol.	(C) 20100	**1**
16.	If the HCF (2520, 6600) = 40 and LCM (2520, 6600) = 252 × k, then the value of k is (A) 1650 (B) 1600 (C) 165 (D) 1625	
Sol.	(A) 1650	**1**
17.	In the given figure ΔABC is shown. DE is parallel to BC. If AD = 5 cm, DB = 2.5 cm and BC = 12 cm, then DE is equal to  (A) 10 cm (B) 6 cm (C) 8 cm (D) 7.5 cm	
Sol.	(C) 8 cm	**1**

18.	XOYZ is a rectangle with vertices X(–3, 0), O(0, 0), Y(0, 4) and Z(x, y). The length of its each diagonal is (A) 5 units (B) $\sqrt{5}$ units (C) $x^2 + y^2$ units (D) 4 units	
Sol.	(A) 5 units	**1**
	Directions : In Question **19** and **20**, **Assertion (A)** and **Reason (R)** are given. Select the correct option from the following : (A) Both Assertion (A) and Reason (R) are true. Reason (R) is the correct explanation of Assertion (A). (B) Both Assertion (A) and Reason (R) are true. Reason (R) does not give correct explanation of (A). (C) Assertion (A) is true but Reason (R) is not true. (D) Assertion (A) is not true but Reason (R) is true.	
19.	**Assertion (A) :** Two cubes each of edge length 10 cm are joined together. The total surface area of newly formed cuboid is 1200 cm^2. **Reason (R) :** Area of each surface of a cube of side 10 cm is 100 cm^2.	
Sol.	(D) Assertion (A) is not true but Reason (R) is true.	**1**
20.	**Assertion (A) :** If $\sin A = \frac{1}{3}$ $(0° < A < 90°)$, then the value of cos A is $\frac{2\sqrt{2}}{3}$ **Reason (R) :** For every angle θ, $\sin^2\theta + \cos^2\theta = 1$.	
Sol.	(A) Both Assertion (A) and (R) are true. Reason (R) is the correct explanation of Assertion (A)	**1**
	SECTION B **In this section, there are 5 questions of 2 marks each.**	

21.	In the given figure, AB and CD are tangents to a circle centred at O. Is ∠BAC = ∠DCA ? Justify your answer.  	
Sol.	 Construction: Join OA and OC OA=OC ∠OAC=∠OCA Also, ∠OAB=∠OCD ⟹∠OAC+∠OAB=∠OCA+∠OCD ⟹∠BAC=∠DCA	½ ½ ½ ½
22(a).	In what ratio is the line segment joining the points (3, –5) and (–1, 6) divided by the line y = x ?	
Sol.	 Let the required ratio be K:1 Coordinates of point P are $\left(\frac{-K+3}{K+1}, \frac{6K-5}{K+1}\right)$ Point P lies on line y = x ⟹ $\frac{-K+3}{K+1} = \frac{6K-5}{K+1}$	 **1** ½

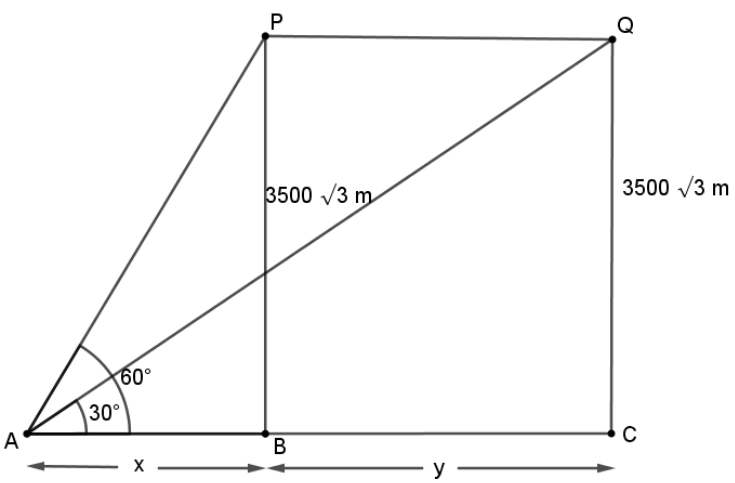
	Solving, we get K $= \frac{8}{7}$ ∴ Required ratio is 8: 7	½
	OR	
22(b).	A(3, 0), B(6, 4) and C(–1, 3) are vertices of a triangle ABC. Find length of its median BE.	
Sol.	Mid-point of AC is $E\left(1, \frac{3}{2}\right)$ Length of median BE $= \sqrt{(6-1)^2 + (4-\frac{3}{2})^2} = \sqrt{\frac{125}{4}}$ or $\frac{5\sqrt{5}}{2}$	**1** **1**
23.	Explain why 7 × 11 × 13 + 13 and 7 × 6 × 5 × 4 × 3 × 2 × 1 + 5 are composite numbers.	
Sol.	$7 \times 11 \times 13 + 13 = 13 \times 78$ or $2 \times 3 \times 13^2$ and $7 \times 6 \times 5 \times 4 \times 3 \times 2 \times 1 + 5 = 5 \times 1009$ Both numbers have two factors other than 1 ∴ both the numbers are composite	**1** ½ ½
24.	The vertices of a ΔABC are A(–2, 4), B(4, 3) and C(1, –6). Find length of the median BD.	
Sol.	Mid-point of AC is D $\left(-\frac{1}{2}, -1\right)$ Length of median BD $= \sqrt{(4+\frac{1}{2})^2 + (3+1)^2} = \sqrt{\frac{145}{4}}$ or $\frac{\sqrt{145}}{2}$	**1** **1**

25(a).	Evaluate : $2\sin^2 30° \sec 60° + \tan^2 60°$.	
Sol.	$2sin^2 30° \sec 60° + tan^2 60°$ $= 2 \times \left(\frac{1}{2}\right)^2 \times 2 + \left(\sqrt{3}\right)^2$ $= 4$	**1½** **½**
	OR	
25(b).	If $2 \sin (A + B) = \sqrt{3}$ and $\cos (A - B) = 1$, then find the measures of angles A and B. $0 \leq A, B, (A + B) \leq 90°$.	
Sol.	$\sin(A + B) = \frac{\sqrt{3}}{2} \Rightarrow A + B = 60°$ … (1) $\cos(A - B) = 1 \Rightarrow A - B = 0°$ … (2) Solving (1) and (2), we get $A = B = 30°$	**½** **½** **1**
	SECTION C **This section consists of 6 questions of 3 marks each.**	
26(a).	In the given figure, PQ is tangent to a circle centred at O and $\angle BAQ = 30°$; show that BP = BQ. 	
Sol.		

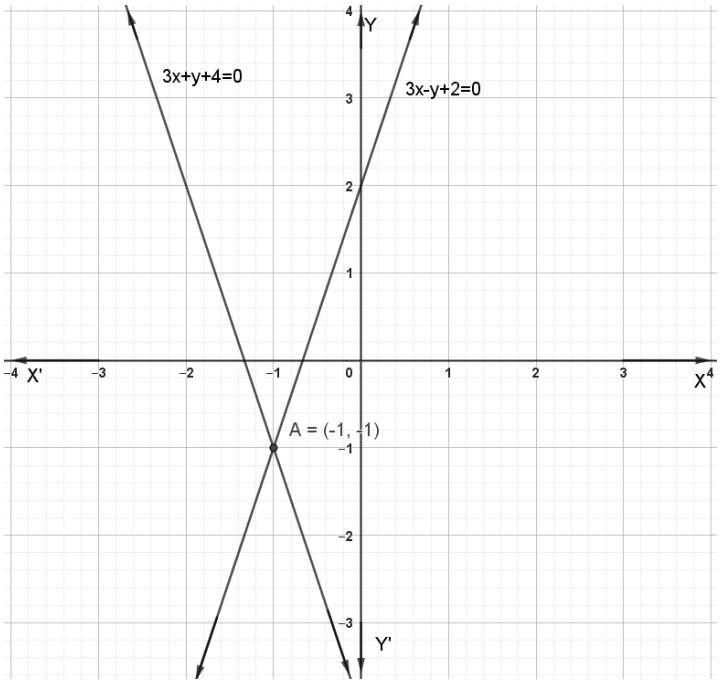
	Join OQ OQ=OA $\Rightarrow \angle 2 = 30^0$ $\angle 3 = 90^0 - 30^0 = 60^0$ $\angle 4 = 90^0 - 60^0 = 30^0$ $\angle 6 = \angle 1 + \angle 2 = 60^0$ Hence $\angle 5 = 90^0 - 60^0 = 30^0 = \angle 4$ $\therefore$ BP=BQ	½ ½ ½ ½ ½ ½
	OR	
26(b).	In the given figure, AB, BC, CD and DA are tangents to the circle with centre O forming a quadrilateral ABCD. Show that $\angle AOB + \angle COD = 180°$  	
Sol.	 Join OP, OQ, OR and OS $\Delta POB \cong \Delta QOB$ $\Rightarrow \angle 1 = \angle 2$ Similarly $\angle 3 = \angle 4, \angle 5 = \angle 6, \angle 7 = \angle 8$ Now, $\angle 1 + \angle 2 + \angle 3 + \angle 4 + \angle 5 + \angle 6 + \angle 7 + \angle 8 = 360°$ $\Rightarrow 2(\angle 1 + \angle 8 + \angle 4 + \angle 5) = 360°$	 ½ **1** ½ ½

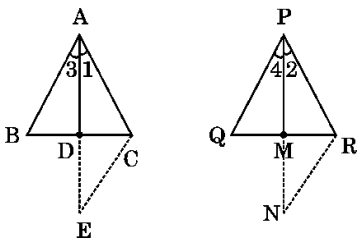
	$\therefore \angle AOB + \angle COD = 180°$	½
27.	In a test, the marks obtained by 100 students (out of 50) are given below : **Marks obtained :** 0 – 10 | 10 – 20 | 20 – 30 | 30 – 40 | 40 – 50 **Number of students :** 12 | 23 | 34 | 25 | 6 Find the mean marks of the students.	
Sol.	Marks Obtained: 0 – 10 | 10 – 20 | 20 – 30 | 30 – 40 | 40 – 50 | Total Number of students (f_i): 12 | 23 | 34 | 25 | 6 | 100 x_i: 5 | 15 | 25 | 35 | 45 | f_ix_i: 60 | 345 | 850 | 875 | 270 | 2400 $\text{Mean} = \frac{2400}{100}$ $= 24$	**1½ marks for correct table** **1** ½
28.	Three consecutive integers are such that sum of the square of second and product of other two is 161. Find the three integers.	
Sol.	Let the three numbers be x, x+1 and x+2 $\Rightarrow (x+1)^2 + x(x+2) = 161$ $\Rightarrow x^2 + 2x - 80 = 0$ $\Rightarrow$ (x+10)(x-8)=0 $\therefore$ x= 8 or -10 So, the numbers are 8, 9, 10 or -10, -9, -8	½ **1** ½ ½ ½

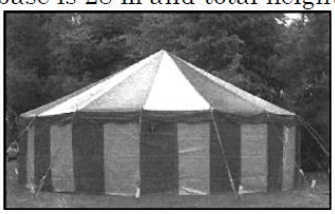
29(a).	If the sum of first m terms of an A.P. is same as sum of its first n terms ($m \neq n$), then show that the sum of its first $(m + n)$ terms is zero.	
Sol.	$S_m = S_n$ $\Rightarrow \frac{m}{2}[2a + (m-1)d = \frac{n}{2}[2a + (n-1)d]$ $\Rightarrow 2a(m-n) = d(n^2 - m^2) - d(n-m)$ $\Rightarrow 2a = -d(m+n-1)$ or $2a + (m+n-1)d = 0$ i.e., $S_{m+n} = \frac{m+n}{2}[2a + (m+n-1)d] = 0$	**1** **1** ½ ½
	OR	
29(b).	In an A.P., the sum of three consecutive terms is 24 and the sum of their squares is 194. Find the numbers.	
Sol.	Let the numbers be $a - d, a, a + d$ $\therefore a - d + a + a + d = 24$ $\Rightarrow a = 8$ Also, $(a-d)^2 + a^2 + (a+d)^2 = 194$ $\Rightarrow (8-d)^2 + 8^2 + (8+d)^2 = 194$ $\Rightarrow d^2 = 1 \Rightarrow d = \pm 1$ $\therefore$ Numbers are 7, 8, 9 or 9,8,7	½ ½ **1** ½ ½
30.	Prove that $\sqrt{5}$ is an irrational number.	
Sol.	Let $\sqrt{5}$ be a rational number. $\therefore \sqrt{5} = \frac{p}{q}$, where $q \neq 0$ and let p & q be co-prime. $5q^2 = p^2 \Rightarrow p^2$ is divisible by 5 $\Rightarrow$ p is divisible by 5 ----- (i) $\Rightarrow p = 5a$, where 'a' is some integer $25a^2 = 5q^2 \Rightarrow q^2 = 5a^2 \Rightarrow q^2$ is divisible by 5 $\Rightarrow$ q is divisible by 5 ----- (ii) (i) and (ii) leads to contradiction as 'p' and 'q' are co-prime.	½ **1** **1** ½

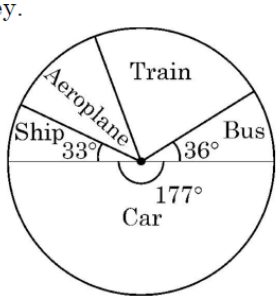
31.	Prove that $\sin^6\theta + \cos^6\theta = 1 - 3\sin^2\theta\cos^2\theta$.	
Sol.	LHS = $\sin^6\theta + \cos^6\theta$ = $(\sin^2\theta)^3 + (\cos^2\theta)^3$ = $(\sin^2\theta + \cos^2\theta)[(\sin^2\theta)^2 + (\cos^2\theta)^2 - \sin^2\theta\cos^2\theta]$ = $\sin^4\theta + \cos^4\theta - \sin^2\theta\cos^2\theta$ = $(\sin^2\theta + \cos^2\theta)^2 - 2\sin^2\theta\cos^2\theta - \sin^2\theta\cos^2\theta$ = $1 - 3\sin^2\theta\cos^2\theta$ = RHS	½ **1** **1** ½
	SECTION D **This section consists of 4 questions of 5 marks each.**	
32.	The angle of elevation of an aircraft from a point A on the ground is 60°. After a flight of 30 seconds, the angle of elevation changes to 30°. The aircraft is flying at a constant height of $3500\sqrt{3}$ m at a uniform speed. Find the speed of the aircraft.	
Sol.	 Let P and Q be the positions of aircraft at two different times.	**1 mark for correct figure**

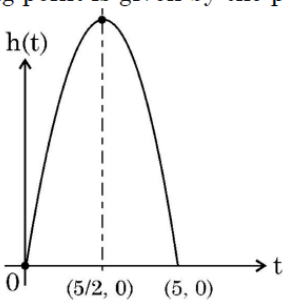
	$\tan 60° = \sqrt{3} = \frac{3500\sqrt{3}}{x}$ $\Rightarrow x = 3500$ m ... (i) $\tan 30° = \frac{1}{\sqrt{3}} = \frac{3500\sqrt{3}}{x+y} \Rightarrow x + y = 10500$ Using (i), we get y = 7000 $\therefore$ Speed of aircraft = $\frac{7000}{30} = \frac{700}{3}$ or 233. 3 m/s approx.	**1** **½** **1** **½** **1**
33.	If the length of a rectangle is reduced by 5 cm and its breadth is increased by 2 cm, then the area of the rectangle is reduced by 80 cm^2. However, if we increase the length by 10 cm and decrease the breadth by 5 cm, its area is increased by 50 cm^2. Find the length and breadth of the rectangle.	
Sol.	Let the length of rectangle be x cm and the breadth be y cm Area of rectangle = xy (x-5) (y+2) = xy - 80 $\Rightarrow$ 2x - 5y + 70 = 0 (x+10) (y-5) = xy + 50 $\Rightarrow$ -5x + 10 y - 100 = 0 Solving the two equations, we get x = 40 and y = 30 $\therefore$ Length of rectangle = 40 cm and Breadth of rectangle = 30 cm	**½** **1½** **1½** **1+½**

34(a).	Using graphical method, solve the following system of equations : $3x + y + 4 = 0$ and $3x - y + 2 = 0$	
Sol.	 Correct solution $x = -1, y = -1$	**2 marks for each correct line** **1**
	OR	
34(b).	Tara scored 40 marks in a test, getting 3 marks for each right answer and losing 1 mark for each wrong answer. Had 4 marks been awarded for each correct answer and 2 marks been deducted for each wrong answer, then Tara would have scored 50 marks. Assuming that Tara attempted all questions, find the total number of questions in the test.	
Sol.	Let number of correct answers be x and number of incorrect answers be y	

	$3x - y = 40$ $4x - 2y = 50$ Solving, we get $x = 15, y = 5$ $\therefore$ Total number of questions = 20	**1½** **1½** **1** **1**
35(a).	If a line is drawn parallel to one side of a triangle to intersect the other two sides in distinct points, then prove that the other two sides are divided in the same ratio.	
Sol.	Correct Given, to prove, figure, construction Correct proof	**½ ×4=2** **3**
	OR	
35(b).	Sides AB and AC and median AD to ΔABC are respectively proportional to sides PQ and PR and median PM of another triangle PQR. Show that $\Delta ABC \sim \Delta PQR$.	
Sol.	 Correct figure Produce AD to E such that AD = DE and join EC Produce PM to N such that PM = MN and join NR $\Delta ADB \cong \Delta EDC$ $\therefore AB = EC$ Similarly, $PQ = NR$ Since, $\frac{AB}{PQ} = \frac{AC}{PR} = \frac{AD}{PM}$ $\Rightarrow \frac{EC}{NR} = \frac{AC}{PR} = \frac{\frac{AE}{2}}{\frac{PN}{2}}$ $\therefore \Delta AEC \sim \Delta PNR$ $\Rightarrow \angle 1 = \angle 2$ Similarly, $\angle 3 = \angle 4$	**1** **½** **1** **1** **½**

	Hence $\angle 1 + \angle 3 = \angle 2 + \angle 4$ or $\angle A = \angle P$ Also, $\frac{AB}{PQ} = \frac{AC}{PR}$ $\therefore\ \Delta ABC \sim \Delta PQR$	½ ½
	SECTION E **This section comprises of 3 case-study based questions of 4 marks each.**	
36.	The word 'circus' has the same root as 'circle'. In a closed circular area, various entertainment acts including human skill and animal training are presented before the crowd. A circus tent is cylindrical upto a height of 8 m and conical above it. The diameter of the base is 28 m and total height of tent is 18.5 m.  Based on the above, answer the following questions : (i) Find slant height of the conical part. **1** (ii) Determine the floor area of the tent. **1** (iii) (a) Find area of the cloth used for making tent. **2** **OR** (iii) (b) Find total volume of air inside an empty tent. **2**	
Sol.	(i) Height of conical part $= 18.5 - 8 = 10.5$ m Radius of conical part $= 14$ m Slant height $= \sqrt{(10.5)^2 + (14)^2} = 17.5$ m (ii) Floor area $= \frac{22}{7} \times 14 \times 14 = 616\ m^2$ (iii) (a) Area of cloth used $= 2 \times \frac{22}{7} \times 14 \times 8 + \frac{22}{7} \times 14 \times 17.5$ $= 1474\ m^2$ **OR** (iii) (b) Volume of air inside the tent	½ ½ **1** **1** **1**

	$= \frac{22}{7} \times 14 \times 14 \times 8 + \frac{1}{3} \times \frac{22}{7} \times 14 \times 14 \times 10.5$ $= 7084\ m^3$	**1** **1**
37.	In a survey on holidays, 120 people were asked to state which type of transport they used on their last holiday. The following pie chart shows the results of the survey.  Observe the pie chart and answer the following questions : (i) If one person is selected at random, find the probability that he/she travelled by bus or ship. **1** (ii) Which is most favourite mode of transport and how many people used it ? **1** (iii) (a) A person is selected at random. If the probability that he did not use train is 4/5, find the number of people who used train. **2** **OR** (iii) (b) The probability that randomly selected person used aeroplane is 7/60. Find the revenue collected by air company at the rate of ₹ 5,000 per person. **2**	
Sol.	(i) P (travelling by bus or ship) = $\frac{36+33}{360} = \frac{69}{360}$ or $\frac{23}{120}$ (ii) Car Number of people who used car = $\frac{177}{360} \times 120 = 59$ (iii) (a) P (person used train) = $1 - \frac{4}{5} = \frac{1}{5}$ $\therefore$ Number of people who used train = $\frac{120}{5} = 24$ **OR** (iii) (b) Number of people who used aeroplane = $\frac{7}{60} \times 120 = 14$	**1** ½ ½ **1** **1** **1**

	$\therefore$ Revenue generated$= 14 \times 5000 = ₹\ 70{,}000$	**1**
38.	A ball is thrown in the air so that t seconds after it is thrown, its height h metre above its starting point is given by the polynomial $h = 25t - 5t^2$.  Observe the graph of the polynomial and answer the following questions : (i) Write zeroes of the given polynomial. **1** (ii) Find the maximum height achieved by ball. **1** (iii) (a) After throwing upward, how much time did the ball take to reach to the height of 30 m ? **2** **OR** (iii) (b) Find the two different values of t when the height of the ball was 20 m. **2**	
Sol.	(i) Zeroes of the polynomial are 0 and 5	**1**
	(ii) Maximum height achieved by ball	
	$= 25 \times \frac{5}{2} - 5 \times \left(\frac{5}{2}\right)^2$	½
	$= \frac{125}{4}$ or 31.25 m	½
	(iii) (a) $-5t^2 + 25t = 30$	½
	$\Rightarrow t^2 - 5t + 6 = 0$	½
	$\Rightarrow (t-2)(t-3) = 0$	½
	$t \neq 3,\ \therefore t = 2$	½
	OR	
	(iii) (b) $-5t^2 + 25t = 20$	½
	$\Rightarrow t^2 - 5t + 4 = 0$	½
	$\Rightarrow (t-4)(t-1) = 0$	½
	$\Rightarrow t = 4, 1$	½