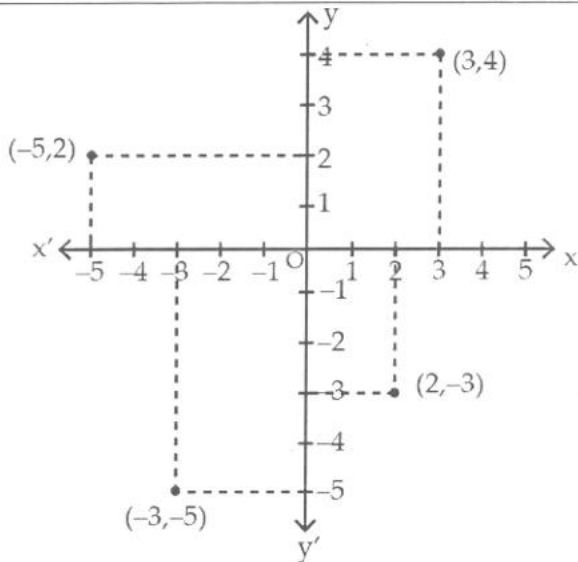
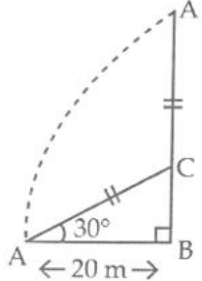


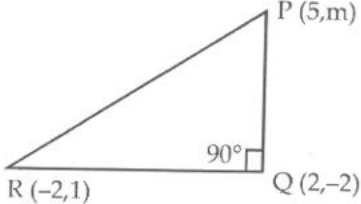
MARKING SCHEME
ALL INDIA SECONDARY SCHOOL EXAMINATION, 2027
Sample Question Paper (2026-27)
Subject: Mathematics and Computing (032)

032-Mathematics and Computing

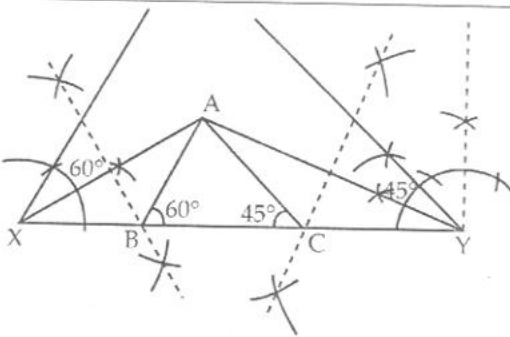
Q.No.	Expected Answer/ Value Points	Distribution of Marks
18.		$\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$
19.	(a) 2, 6, x, 54 and y are in continued fraction. $\frac{2}{6} = \frac{6}{x} = \frac{x}{54} = \frac{54}{y}$ $\Rightarrow x = 18$ and $xy = 54 \times 54$ $y = \frac{54 \times 54}{18}$ $y = 162$	$\frac{1}{2}$ 1 $\frac{1}{2}$
	OR (b) Let numbers are $7x$ and $11x$ But $\frac{7x - 7}{11x - 7} = \frac{3}{5}$ Or $35x - 35 = 33x - 21$ $2x = 14$ $x = 7$ Therefore, numbers are 49 and 77	$\frac{1}{2}$ 1 $\frac{1}{2}$
Section C		
20.	LCM of 3 and 5 = 15 $\frac{1}{3} = \frac{5}{15} \text{ and } \frac{4}{5} = \frac{12}{15}$ Therefore, 3 rational numbers between $\frac{1}{3}$ and $\frac{4}{5}$ are $\frac{6}{15}, \frac{7}{15}, \frac{8}{15}$, or $\frac{2}{5}, \frac{7}{15}, \frac{8}{15}$ (Any other three numbers may be written).	1+1+1
21.	(a) $a + b - c = 4, a^2 + b^2 + c^2 = 38$ Squaring both sides $a^2 + b^2 + c^2 + 2ab - 2bc - 2ca = 16$ $38 + 2(ab - bc - ca) = 16$ $ab - bc - ca = -11$	1 1 1
	OR (b) $a + b + c = 2, ab + bc + ca = -1, abc = -2$	

Q.No.	Expected Answer/ Value Points	Distribution of Marks
	Squaring both sides $a^2 + b^2 + c^2 + 2ab + 2bc + 2ca = 4$ $a^2 + b^2 + c^2 + 2(-1) = 4$ $a^2 + b^2 + c^2 = 6$ But $a^3 + b^3 + c^3 - 3abc = (a + b + c)(a^2 + b^2 + c^2 - ab - bc - ca)$ Therefore, $a^3 + b^3 + c^3 - 3(-2) = 2(6 - (-1))$ $a^3 + b^3 + c^3 = 14 - 6 = 8$	1½ ½ 1
22.	Let AB is a tree, after broken at C meet at ground as in figure. In right angle triangle ABC $\tan 30^\circ = \frac{BC}{20}$ $\frac{1}{\sqrt{3}} = \frac{BC}{20}$ $BC = \frac{20}{\sqrt{3}}$ And $\cos 30^\circ = \frac{AB}{AC}$ $\frac{\sqrt{3}}{2} = \frac{AB}{AC} = \frac{20}{AC} \Rightarrow AC = \frac{40}{\sqrt{3}}$ Total height of the tree = BC + AC $= \frac{20}{\sqrt{3}} + \frac{40}{\sqrt{3}}$ $= \frac{60}{\sqrt{3}} = 20\sqrt{3}\text{m}$	 ½ 1 1 ½
23.	(a) $A = \frac{\sqrt{5} + \sqrt{3}}{\sqrt{5} - \sqrt{3}} \times \frac{\sqrt{5} + \sqrt{3}}{\sqrt{5} + \sqrt{3}}$ $= \frac{5 + 3 + 2\sqrt{15}}{2} = 4 + \sqrt{15}$ $B = \frac{\sqrt{5} - \sqrt{3}}{\sqrt{5} + \sqrt{3}} \times \frac{\sqrt{5} - \sqrt{3}}{\sqrt{5} - \sqrt{3}}$ $= \frac{5 + 3 - 2\sqrt{15}}{2} = 4 - \sqrt{15}$ $A^2 + B^2 = (4 + \sqrt{15})^2 + (4 - \sqrt{15})^2$ $= 16 + 15 + 8\sqrt{15} + 16 + 15 - 8\sqrt{15}$ $= 62$ OR (b) $\frac{3\sqrt{2} + 2\sqrt{3}}{5\sqrt{2} - 4\sqrt{3}} \times \frac{5\sqrt{2} + 4\sqrt{3}}{5\sqrt{2} + 4\sqrt{3}}$ $= \frac{30 + 12\sqrt{6} + 10\sqrt{6} + 24}{50 - 48}$	1 1 1 ½ 1

Q.No.	Expected Answer/ Value Points	Distribution of Marks
	$= \frac{54 + 22\sqrt{6}}{2} = 27 + 11\sqrt{6}$ But $27 + 11\sqrt{6} = a + b\sqrt{6}$ $\Rightarrow a = 27, b = 11$	$\frac{1}{2}$ $\frac{1}{2} + \frac{1}{2}$
24.	(a) $3 \cot \theta = 4$ or $\cot \theta = \frac{4}{3}$ $LHS = \frac{5 \sin \theta + 3 \cos \theta}{5 \sin \theta - 3 \cos \theta}$ $= \frac{5+3 \cot \theta}{5-3 \cot \theta} \text{ (Dividing by } \sin \theta \text{ in Nr and Dr)}$ $= \frac{5 + 3 \times \frac{4}{3}}{5 - 3 \times \frac{4}{3}} = 9 = RHS$ OR (b) $\sin \theta = \sqrt{3} \cos \theta$ $\Rightarrow \tan \theta = \sqrt{3}$ $\Rightarrow \theta = 60^\circ$ $LHS = 2 \sin^2 60^\circ - 3 \cos^2 60^\circ + \cot^2 60^\circ$ $= 2 \times \left(\frac{\sqrt{3}}{2}\right)^2 - 3 \times \left(\frac{1}{2}\right)^2 + \left(\frac{1}{\sqrt{3}}\right)^2$ $= 2 \times \frac{3}{4} - 3 \times \frac{1}{4} + \frac{1}{3}$ $= \frac{3 \times 6 - 3 \times 3 + 4}{12}$ $= \frac{13}{12}$ $= RHS$	 2 1 1 2
25.	Correct graph Area of the triangle ABC = $\frac{1}{2} \times 5 \times 2$ $= 5$ square units	 2 1

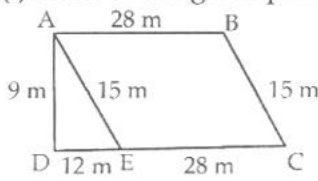
Q.No.	Expected Answer/ Value Points	Distribution of Marks
26.	Using distance formula $PQ = \sqrt{(3)^2 + (m+2)^2}$ $QR = \sqrt{(4)^2 + (-3)^2} = 5$ $PR = \sqrt{(7)^2 + (m-1)^2}$ Using Pythagoras theorem $PR^2 = PQ^2 + QR^2$ $49 + (m-1)^2 = 9 + (m+2)^2 + 25$ $m^2 + 1 - 2m - m^2 - 4 - 4m = -15$ $-6m = -12$ $m = 2$ 	$\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ 1
27.	(a) $m = \frac{4\sqrt{6}}{\sqrt{3} + \sqrt{2}} = \frac{2 \times 2\sqrt{3} \times \sqrt{2}}{\sqrt{3} + \sqrt{2}} \dots (1)$ or $\frac{m}{2\sqrt{3}} = \frac{2\sqrt{2}}{\sqrt{3} + \sqrt{2}}$ (from (1)) $\text{or } \frac{m + 2\sqrt{3}}{m - 2\sqrt{3}} = \frac{3\sqrt{2} + \sqrt{3}}{\sqrt{2} - \sqrt{3}} \dots (2) \text{ (using componendo - dividendo)}$ Also $\frac{m}{2\sqrt{2}} = \frac{2\sqrt{3}}{\sqrt{3} + \sqrt{2}}$ (from (1)) $\frac{m + 2\sqrt{2}}{m - 2\sqrt{2}} = \frac{3\sqrt{3} + \sqrt{2}}{\sqrt{3} - \sqrt{2}} \dots (3) \text{ (using componende - dividendo)}$ Adding (2) and (3) $LHS = \frac{m + 2\sqrt{3}}{m - 2\sqrt{3}} + \frac{m + 2\sqrt{2}}{m - 2\sqrt{2}} = \frac{2(\sqrt{3} - \sqrt{2})}{\sqrt{3} - \sqrt{2}} = 2 = RHS$ OR (b) $\frac{x}{1} = \frac{\sqrt{2m+1} + \sqrt{2m-1}}{\sqrt{2m+1} - \sqrt{2m-1}}$ Using componendo and dividendo $\frac{x+1}{x-1} = \frac{2\sqrt{2m+1}}{2\sqrt{2m-1}}$ Squaring both sides $\frac{x^2 + 1 + 2x}{x^2 + 1 - 2x} = \frac{2m+1}{2m-1}$ Again using componendo and dividendo $\frac{2x^2 + 2}{4x} = \frac{4m}{2}$ or $x^2 + 1 = 4mx$ or $x^2 - 4mx + 1 = 0$	1 1 1 $\frac{1}{2}$ 1 $\frac{1}{2}$

Q.No.	Expected Answer/ Value Points	Distribution of Marks																								
28.	Table of each bar's height for the fuel efficiency of each vehicle <table border="1"><thead><tr><th>Vehicle</th><th>Aeroplane</th><th>Bus</th><th>Car</th><th>Motor cycle</th><th>Train</th></tr></thead><tbody><tr><td>Distance (km)</td><td>900</td><td>600</td><td>400</td><td>200</td><td>800</td></tr><tr><td>Fuel Efficiency</td><td>18</td><td>15</td><td>20</td><td>25</td><td>16</td></tr><tr><td>Height (D/FE)</td><td>50</td><td>40</td><td>20</td><td>8</td><td>50</td></tr></tbody></table> The bar graph has a vertical y-axis labeled 'Height (D/FE)' ranging from 0 to 50 in increments of 10. The horizontal x-axis is labeled 'Fuel Efficiency (km/litre)'. Five bars are shown, each with diagonal hatching. The bars are labeled: Aeroplane (height 50), Bus (height 40), Car (height 20), Motorcycle (height 8), and Train (height 50).	Vehicle	Aeroplane	Bus	Car	Motor cycle	Train	Distance (km)	900	600	400	200	800	Fuel Efficiency	18	15	20	25	16	Height (D/FE)	50	40	20	8	50	1 2
Vehicle	Aeroplane	Bus	Car	Motor cycle	Train																					
Distance (km)	900	600	400	200	800																					
Fuel Efficiency	18	15	20	25	16																					
Height (D/FE)	50	40	20	8	50																					
29.	(a) Given: 'C' is the mid point of PQ $\angle BPC = \angle AQC$ and $\angle ACP = \angle BCQ$ To prove: (i) $\triangle BPC \cong \triangle AQC$ (ii) $PB = QA$ (iii) $\angle A = \angle B$ Proof: (i) In $\triangle BPC$ and $\triangle AQC$ $PB = QA$ (Given) $\angle BPC = \angle AQC$ (Given) But $\angle ACP = \angle BCQ$ (Given) $\angle ACP + \angle ACB = \angle AQC + \angle ACB$ (adding $\angle ACB$ on both sides) or $\angle PCB = \angle QCA$ By ASA congruence criteria $\triangle BPC \cong \triangle AQC$ (ii) $PB = QA$ (By CPCT) (iii) $\angle A = \angle B$ (By CPCT) The diagram shows a horizontal line segment PQ with point C as its midpoint. Two lines, AP and BQ, intersect at point C. Angles APC and BQC are marked with single arcs, and angles ACP and BCQ are marked with double arcs. The vertices A and B are positioned above the line PQ.	2 $\frac{1}{2}$ $\frac{1}{2}$																								
	OR (b) The diagram shows a large triangle XYZ with vertex X on the left, Y on the right, and Z at the top. Points Q and R are located on the base XY. A line segment ZR is drawn. Angles are labeled: $\angle X = 120^\circ$, $\angle Y = 52^\circ$, and $\angle Z = 75^\circ$. At vertex X, the angle between the extension of XY and XZ is labeled w. At vertex Z, the angle between XZ and ZR is labeled y, and the angle between ZR and RY is labeled x. At vertex Y, the angle between YZ and RY is labeled z. Segments ZQ and ZR are marked with single tick marks, indicating they are equal in length.																									

Q.No.	Expected Answer/ Value Points	Distribution of Marks
	In $\triangle PRY$ $z + 52^\circ = 75^\circ$ (Exterior angle property) $z = 23^\circ$ In $\triangle PQR$, $PQ = PR$ (Given) $x + 75^\circ + 75^\circ = 180^\circ$ (Angle sum property) $x = 30^\circ$ Again in $\triangle PQR$, $x + 75^\circ = w$ (Exterior angle property) $w = 105^\circ$ And in $\triangle PQX$, $y + w = 120^\circ$ (Exterior angle property) $y = 15^\circ$ Therefore, $x = 30^\circ, y = 15^\circ, z = 23^\circ, w = 105^\circ$	$\frac{1}{2}$ 1 $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$
	Section D	
30.	 Correct construction Steps of constructions	3 2
31.	(a) In $\triangle ABC$, $\angle B = 90^\circ$, $AB = 28$ cm, $BC = 21$ cm Using Pythagoras theorem $AC^2 = (28)^2 + (21)^2$ $= 784 + 441$ $AC^2 = 1225$ $AC = 35$ Therefore, radius of semicircle (AC is diameter) = $\frac{35}{2}$ cm And area of semicircle = $\frac{1}{2} \times \frac{22}{7} \times \frac{35}{2} \times \frac{35}{2}$ $= \frac{1925}{2} = 962.5 \text{ cm}^2$ Area of $\triangle ABC = \frac{1}{2} \times 28 \times 21 = 294 \text{ cm}^2$ Area of quadrant = $\frac{1}{4} \times \frac{22}{7} \times 21 \times 21$ $= 346.5 \text{ cm}^2$ Therefore, area of shaded region $= 962.5 + 294 - 346.5$ $= 910 \text{ cm}^2$	1 1 1 1

Q.No.	Expected Answer/ Value Points	Distribution of Marks
	OR (b) In figure Area of the sector $ \begin{aligned} &= \pi \times 21 \times 21 \times \frac{120}{360} \\ &= \pi \times 21 \times 7 \\ &= \frac{22}{7} \times 21 \times 7 \\ &= 462 \text{ cm}^2 \end{aligned} $ Area of the ΔOAB $= \frac{1}{2} AB \times OP$ Again in ΔOAP $\sin 60^\circ = \frac{AP}{21} \Rightarrow AP = \frac{21\sqrt{3}}{2} \left[\sin 60^\circ = \frac{\sqrt{3}}{2} \right]$ Therefore, $AB = 21\sqrt{3}$ And $\cos 60^\circ = \frac{OP}{21} \Rightarrow OP = \frac{21}{2} \left[\cos 60^\circ = \frac{1}{2} \right]$ Therefore, Area of the $\Delta OAB = \frac{1}{2} \times 21\sqrt{3} \times \frac{21}{2}$ $= \frac{441\sqrt{3}}{4} \text{ cm}^2$ and Area of the minor segment $= 462 - \frac{441\sqrt{3}}{4} \text{ cm}^2$ Again, area of the major segment $ \begin{aligned} &= \frac{22}{7} \times 21 \times 21 - \left(462 - \frac{441\sqrt{3}}{4} \right) \\ &= 1386 - 462 + \frac{441\sqrt{3}}{4} \\ &= 924 + \frac{441\sqrt{3}}{4} \text{ cm}^2 \end{aligned} $	1 2 1 1
32.	Let $p(x) = x^3 + kx^2 - 9x + 3$ $p(3) = (3)^3 + 9k - 27 + 3 = 21$ (Given) $\Rightarrow 9k = 18 \Rightarrow k = 2$ $ \begin{array}{r} x^2 + 5x + 6 \\ x - 3 \overline{) x^3 + 2x^2 - 9x + 3} \\ \underline{x^3 3x^2} \\ 5x^2 - 9x + 3 \\ \underline{5x^2 15x} \\ 6x + 3 \\ \underline{6x 18} \\ 21 \end{array} $	1

Q.No.	Expected Answer/ Value Points	Distribution of Marks
	Quotient = $x^2 + 5x + 6$ Now polynomial $x^3 + kx^2 - 9x - 18 = p(x) - 21$ Therefore, $x^3 + 2x^2 - 9x - 18 = (x - 3)(x^2 + 5x + 6)$ $= (x - 3)(x + 2)(x + 3)$ and zeroes of the polynomial are 3, -2, -3	2 1 1
33.	(a) Given: In ΔPQR, M and N are the mid points of PQ and PR respectively To prove: $MN \parallel QR$ And $MN = \frac{1}{2} QR$ Construction: Draw a line RX parallel to PQ. Extend MN upto S. Proof: In ΔPMN and ΔRSN $PN = RN$ (Given) $\angle 1 = \angle 2$ (vertically opposite angles) $\angle P = \angle R$ (alternate interior angles) By ASA, $\Delta PMN \cong \Delta RSN$ By CPCT $MN = NS \dots (1)$ $PM = RS = MQ$ Also, $RS \parallel MQ$ (by construction) Since one pair of opposite sides are equal and parallel. Therefore, QRSM is parallelogram and therefore, $MN \parallel QR$ Also, $MN = NS \dots$ (from 1) And $MN = \frac{1}{2} MS$ $MN = \frac{1}{2} QR$ ($MS = QR$) proved.	1 1 (figure) 3
	OR (b) Given: In $\square PQRS$, $PR = QS$ and diagonals PR and QS bisect each other at right angles. To prove: $\square PQRS$ is a square Proof: Let T be the intersection point of diagonals $TS = TQ = TP = TR \dots (1)$ (Given) $\angle PTQ = \angle QTR = \angle RTS$ $= \angle STP = 90^\circ \dots (2)$ (Given) Using (1) and (2) $\Delta TPQ, \Delta TQR, \Delta TRS$ and ΔTSP are congruent (By SAS) Therefore, $PQ = QR = RS = SP$ (By CPCT) In ΔSPQ and ΔRQP $SP = RQ$ (Proved) $PQ = QP$ (Common)	1 1 (figure)

Q.No.	Expected Answer/ Value Points	Distribution of Marks
	$SQ = RP$ (Given) Therefore, $\Delta SPQ \cong \Delta RQP$ (By SSS) And $\angle P = \angle Q = 90^\circ$ Similarly, $\angle Q = \angle R, \angle R = \angle S$ and $\angle S = \angle P$ Or $\angle P = \angle Q = \angle R = \angle S = 90^\circ$ Since $PQ = QR = RS = SP$ And $\angle P = \angle Q = \angle R = \angle S = 90^\circ$ Therefore, $PQRS$ is a square. Proved	3
Section E		
34.	Total number of bracelets = 300 (i) P (one bangle bracelet) = $\frac{40}{300} = \frac{2}{15}$ (ii) P (any one bracelet) = $\frac{300}{300} = 1$ (iii) Number of neither chain nor pearl bracelets = $300 - 135 = 165$ Therefore, P (Neither chain nor pearl bracelet) = $\frac{165}{300} = \frac{11}{20}$	1 1 1 1
35.	(i) Area of the grass planted = Area of ΔADE + Area of $\square AECB$  $\left[\frac{1}{2} \times 12 \times AD = 54 \Rightarrow AD = 9 \right]$ In ΔADE $s = \frac{36}{2} = 18$ And area of $\Delta ADE = \sqrt{18 \times 9 \times 6 \times 3}$ $= 54 m^2$ Area of parallelogram = 28×9 $= 252 m^2$ Therefore, required area = $306 m^2$ OR As ΔADE is right angle triangle and distance between parallel lines = $9 m$ Therefore, area of the trapezium = $\frac{1}{2} \times 68 \times 9 = 306 m^2$ (ii) Perimeter for fencing = $92 - 4 = 88 m$ Therefore, cost of fencing = ₹ 88×50 $= ₹ 4400$	2
