

केंद्रीय विद्यालय संगठन, बेंगलुरु संभाग
KENDRIYA VIDYALAYA SANGATHAN, BENGALURU REGION
 प्रथम प्री-बोर्ड परीक्षा २०२५-२६

FIRST PRE-BOARD EXAMINATION-2025-26

Class: X

Max Marks: 80

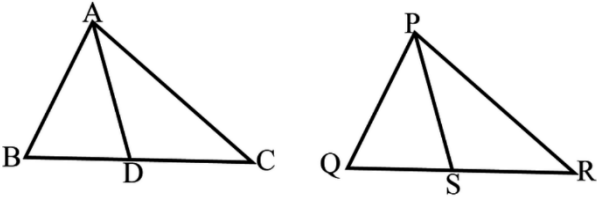
Subject: MATHEMATICS(STANDARD)

Time: 3 hrs.

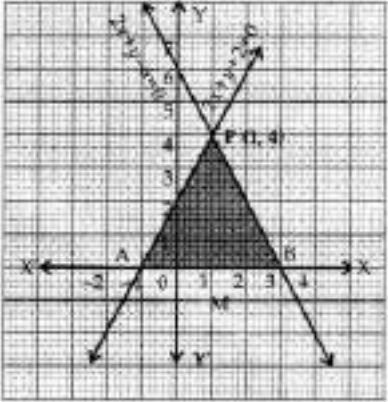
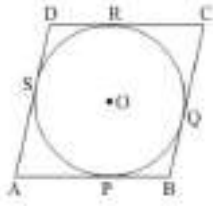
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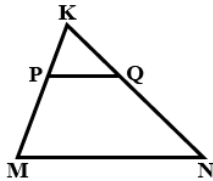
MARKING SCHEME

QNO	SECTION A	MARKS
1	(c) 63	1
2	(b) 6	1
3	(d) $a = c$	1
4	(c) 6	1
5	(b) $8, \frac{1}{8}$	1
6	(d) neither x-axis nor y-axis	1
7	(b) 0	1
8	(c) 3600	1
9	(c) $\frac{5}{6}$	1
10	(b) 20	1
11	(d) 35	1
12	(b) 13 m	1
13	(c) 5 cm	1
14	(d) 72^0	1
15	(c) 60°	1
16	(a) 120^0	1
17	(c) 5500cm^2	1
18	(a) $\frac{1}{6}$	1
19	(b) Both assertion (A) and reason (R) are true but reason (R) is not the correct explanation of assertion (A)	1
20	(d) Assertion (A) is false but Reason (R) is true.	1
	SECTION B	
21	Interest for first week = ₹60 Interest for second week = ₹63 A.P formed 60, 63, 66, ... $a = 60$ $d = 3$ $a_{20} = a + 19d$ $= 60 + 19(3)$	$\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$

	$= 60 + 57$ $a_{20} = ₹117$ (OR) $a_4 = 0$ $a + 3d = 0$ $a = -3d$ $a_{11} = a + 10d$ $= -3d + 10d = 7d$ $a_{25} = a + 24d$ $a_{25} = -3d + 24d = 21d = 3 \times 7d = 3 \times a_{11}$	$\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$
22	Given $\triangle ABD \sim \triangle PQS$ $AB / PQ = BD / QS$ $AB / PQ = 2 \times BD / 2 \times QS$ $\Rightarrow AB / PQ = BC / QR$ and $\angle B = \angle Q$ $\therefore \triangle ABC \sim \triangle PQR$ (SAS) 	$\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$
23	$3k = \tan^2 60^\circ - 2 \sin^2 30^\circ + 2 \tan^2 45^\circ,$ $3k = (\sqrt{3})^2 - 2(\frac{1}{2})^2 + 2(1)^2$ $3k = 3 - 2(\frac{1}{4}) + 2$ $3k = 5 - \frac{1}{2}$ $3k = (10-1)/2$ $3k = 9/2$ $k = 9/6$ $k = 3/2$	$\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$
24	Given: PA and PB are tangents drawn from an external point P to the circle. $\therefore PA = PB = 4$ cm $\angle BAC + \angle ABP = 180^\circ$ (Linear pair) $135^\circ + \angle ABP = 180^\circ \Rightarrow \angle ABP = 45^\circ$ Since $PA = PB$ $\angle BAP = \angle ABP = 45^\circ$ $\angle APB = 180^\circ - (45^\circ + 45^\circ) = 90^\circ$ By Pythagoras theorem: $AB^2 = AP^2 + BP^2 = 4^2 + 4^2 = 32$ $\therefore AB = \sqrt{32} = 4\sqrt{2}$ cm	$\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$
25	Let assume that length of rope be represented by r such that $r = 14$ m. Area grazed by a horse $= \frac{\pi r^2 A}{360^\circ}$ Area grazed by a cow $= \frac{\pi r^2 B}{360^\circ}$ Area grazed by a goat $= \frac{\pi r^2 C}{360^\circ}$	

	Total area grazed by a horse, goat and cow $= \frac{\pi r^2 A}{360^\circ} + \frac{\pi r^2 B}{360^\circ} + \frac{\pi r^2 C}{360^\circ}$ $= \frac{\pi r^2}{360^\circ} (A + B + C)$ $= \frac{\pi r^2}{360^\circ} \times 180^\circ$ $= \frac{\pi r^2}{2}$ $= \frac{22 \times 14 \times 14}{7 \times 2}$ $= 22 \times 14$ $= 308 \text{ m}^2$ Hence, the total area of grass field that can be grazed by them is 308 m². (OR) Radius = 14 cm Central angle (θ) = 150° Area covered = $(\theta / 360^\circ) \times \pi r^2$ $= (150 / 360) \times (22/7) \times 14 \times 14$ $= 770 / 3 = 256.66 \text{ cm}^2 \text{ (approximately 257 cm}^2\text{)}$	1/2 1/2 1/2 1/2 1/2 1/2 1/2 1/2
	SECTION C	
26	Let us assume that $\sqrt{3}$ is rational $\sqrt{3} = \frac{a}{b}$, where a and b are co-primes. Squaring both side $(\sqrt{3})^2 = a^2 / b^2$ $3b^2 = a^2,$ 3 divides a², 3 divides a Let us consider a = 3c, by putting the value of a we get $b^2 = 3c^2,$ 3 divides b², 3 divides b So 3 is a common factor of both a and b, which is a contradiction to our assumption This contradiction has arisen due to our incorrect assumption that $\sqrt{3}$ is rational. Hence we conclude $\sqrt{3}$ is an irrational	1/2 1/2 1/2 1/2 1/2 1/2
27	$3x^2 - 4x + 1$ $3x^2 - 3x - x + 1$ $= 3x(x - 1) - (x - 1)$	1/2

	the given system of equations. In graph, area bounded by the lines and x-axis is ΔPAB which is shaded.  Draw $PM \perp x$-axis Area of $\Delta PAB = \frac{1}{2} \times AB \times PM$ $= \frac{1}{2} \times 4 \times 4 = 8$ sq. units	Graph 1m $\frac{1}{2}$
29	Total number of playing cards = 44 (i) P (a king or a queen) = $4/44 = 1/11$ (ii) P (non-number card) = $8/44 = 2/11$ (iii) P (face card) = $6/44 = 3/22$	1 1 1
30	(a) LHS $\frac{(\sin\theta - \cos\theta)}{(\sin\theta + \cos\theta)} + \frac{(\sin\theta + \cos\theta)}{(\sin\theta - \cos\theta)}$ $((\sin\theta - \cos\theta)^2 + (\sin\theta + \cos\theta)^2) / ((\sin\theta + \cos\theta)(\sin\theta - \cos\theta))$ $= (\sin^2\theta + \cos^2\theta - 2\sin\theta\cos\theta + \sin^2\theta + \cos^2\theta + 2\sin\theta\cos\theta) / (\sin^2\theta - \cos^2\theta)$ $= (\sin^2\theta + \cos^2\theta) + (\sin^2\theta + \cos^2\theta) / (\sin^2\theta - \cos^2\theta)$ $= 1 + 1 / (\sin^2\theta - (1 - \sin^2\theta))$ $= 2 / (\sin^2\theta - 1 + \sin^2\theta)$ $= 2 / (2\sin^2\theta - 1) = \text{RHS}$ (OR) (b) Given $\tan\theta = a/b$ LHS: $(a \sin\theta - b \cos\theta) / (a \sin\theta + b \cos\theta)$ Dividing numerator and denominator by $\cos\theta$: $= (a \sin\theta/\cos\theta - b \cos\theta/\cos\theta) / (a \sin\theta/\cos\theta + b \cos\theta/\cos\theta)$ $= (a \tan\theta - b) / (a \tan\theta + b)$ $= a(a/b) - b / a(a/b) + b$ $= (a^2/b - b) / (a^2/b + b)$ $= ((a^2 - b^2)/b) / ((a^2 + b^2)/b)$ $= (a^2 - b^2) / (a^2 + b^2) = \text{RHS}$	$\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$
31	Consider a parallelogram ABCD which is circumscribing a circle with a centre O. Now, since ABCD is a parallelogram, $AB = CD$ and $BC = AD$. As length of tangents from an external point is equal (i) $DR = DS$ (ii) $BP = BQ$ (iii) $CR = CQ$ (iv) $AP = AS$ Adding we get $DR + BP + CR + AP = DS + BQ + CQ + AS$ $(BP + AP) + (DR + CR) = (CQ + BQ) + (DS + AS)$ 	1 1

	$AB + CD = BC + AD$ $AB = CD$ and $BC = AD$, the above equation becomes $2AB = 2BC$ $\therefore AB = BC$ Since $AB = BC = CD = DA$, it can be said that ABCD is a rhombus.	$\frac{1}{2}$ $\frac{1}{2}$
	SECTION D	
32	Correct given, to prove, construction, figure Correct Proof $\frac{KP}{PM} = \frac{4}{13} \text{ and } KN = 20.4 \text{ cm.}$ $\frac{KP}{KM} = \frac{4}{17} = \frac{KQ}{KN}$ $\frac{4}{17} = \frac{KQ}{20.4}$ $KQ = \frac{4 \times 20.4}{17} = 4.8 \text{ cm}$ 	$4 \times \frac{1}{2} = 2$ 2 $\frac{1}{2}$ $\frac{1}{2}$
33	Let the speed of the stream be x km/hr Given the speed boat in still water is 18 km/hr. speed of the boat in upstream = $(18 - x)$ km/hr Speed of the boat in downstream = $(18 + x)$ km/hr $T_{\text{upstream}} = T_{\text{downstream}} + 1$ $\frac{24}{18-x} = \frac{24}{18+x} + 1$ $\frac{24}{18-x} - \frac{24}{18+x} = 1$ $24 \left[\frac{1}{18-x} - \frac{1}{18+x} \right] = 1$ $24 \left[\frac{(18+x) - (18-x)}{(18-x)(18+x)} \right] = 1$ $24 \left[\frac{18+x-18+x}{(324-x^2)} \right] = 1$ $24 \left[\frac{2x}{(324-x^2)} \right] = 1$ $\Rightarrow 48x = 324 - x^2$ $\Rightarrow x^2 + 48x - 324 = 0$ $\Rightarrow x^2 + 54x - 6x - 324 = 0$ $\Rightarrow x(x + 54) - 6(x + 54) = 0$ $\Rightarrow (x + 54)(x - 6) = 0$ $\Rightarrow x = -54 \text{ or } 6$ Thus, the speed of the stream is 6 km/hr.	$\frac{1}{2}$ $\frac{1}{2}$ 1 $\frac{1}{2}$ 1 1 $\frac{1}{2}$
34	(a) Radius (r) = 2.8 m Height of cylindrical part (h_1) = 3.5 m Height of conical part (h_2) = 2.1 m Slant height of cone (l) = $\sqrt{r^2 + h_2^2}$ $= \sqrt{2.8^2 + 2.1^2}$ $= \sqrt{7.84 + 4.41}$ $= \sqrt{12.25} = 3.5 \text{ m}$	1 $\frac{1}{2}$

	Curved surface area of cylindrical part = $2\pi rh$ $= 2 \times 3.14 \times 2.8 \times 3.5$ $= 61.6 \text{ m}^2$ (approx.) Curved surface area of conical part = πrl $= 3.14 \times 2.8 \times 3.5$ $= 30.8 \text{ m}^2$ (approx.) Total canvas area for one tent = $61.6 + 30.8 = 92.4 \text{ m}^2$ (approx.) Total canvas area for 1500 tents = $1500 \times 92.4 = 1,38,600 \text{ m}^2$ (approx.) Cost of canvas per $\text{m}^2 = ₹120$ Total cost = $1,38,600 \times 120 = ₹16,632,000$ Amount shared by each school = Total cost $\div$ 100 $= ₹16,632,000 \div 100$ $= ₹1,66,320$ $\therefore$ Each school will share ₹1,66,320 approximately. (b) Given: Height of cone (h) = 4 cm, Diameter of base = 8 cm $\Rightarrow$ Radius (r) = 4 cm Volume of toy = Volume of cone + Volume of hemisphere $= \frac{1}{3} \pi r^2 h + \frac{2}{3} \pi r^3$ $= \frac{1}{3} \pi r^2 (h + 2r)$ $= \frac{1}{3} \pi (4)^2 (4 + 2 \times 4) = \frac{1}{3} \times \frac{22}{7} \times 16 \times 12$ $= \frac{1408}{7} = 201.142$ $= 201.14 \text{ cm}^3$ (approx.) Height of toy = Height of cone + Radius of hemisphere = $4 + 4 = 8 \text{ cm}$ Hence, side of cube circumscribing the toy = 8 cm Volume of cube = $a^3 = 8^3 = 512 \text{ cm}^3$ Difference in volumes = Volume of cube – Volume of toy $= 512 - 201.14 = 310.86 \text{ cm}^3$ (approx.)	$\frac{1}{2}$ 1 $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ 1 $\frac{1}{2}$ $\frac{1}{2}$ 1																																	
35	(a) <table border="1"> <thead> <tr> <th>Class interval</th><th>Frequency</th><th>CF</th></tr> </thead> <tbody> <tr> <td>0 – 100</td><td>2</td><td>2</td></tr> <tr> <td>100 – 200</td><td>5</td><td>7</td></tr> <tr> <td>200 – 300</td><td>x</td><td>7+x</td></tr> <tr> <td>300 – 400</td><td>12</td><td>19+x</td></tr> <tr> <td>400 - 500</td><td>17</td><td>36+x</td></tr> <tr> <td>500 - 600</td><td>20</td><td>56+x</td></tr> <tr> <td>600 - 700</td><td>y</td><td>56+x+y</td></tr> <tr> <td>700 - 800</td><td>9</td><td>65+x+y</td></tr> <tr> <td>800 - 900</td><td>7</td><td>72+x+y</td></tr> <tr> <td>900 - 1000</td><td>4</td><td>76+x+y</td></tr> </tbody> </table> $76+x+y = 100$ $x+y = 100-76$ $x+y = 24$	Class interval	Frequency	CF	0 – 100	2	2	100 – 200	5	7	200 – 300	x	7+x	300 – 400	12	19+x	400 - 500	17	36+x	500 - 600	20	56+x	600 - 700	y	56+x+y	700 - 800	9	65+x+y	800 - 900	7	72+x+y	900 - 1000	4	76+x+y	2 $\frac{1}{2}$ $\frac{1}{2}$
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900 - 1000	4	76+x+y																																	

	Median = $l + \left[\frac{\frac{n}{2} - cf}{f}\right] \times h$ Median class is 500–600 $l = 500, h = 100, f = 20, n = 100 \Rightarrow n/2 = 50$ $cf = 36 + x$ $525 = 500 + \left[\frac{50 - (36+x)}{20}\right] \times 100$ $525 = 500 + (14 - x) \times 5$ $25 = 70 - 5x$ $5x = 45 \Rightarrow x = 9$ Total frequency = 100 $\Rightarrow$ sum of all frequencies = $85 + y = 100 \Rightarrow y = 15$ (OR) (b): <table><tr><th>Weight(in Kg)</th><th>f_i</th><th>x_i</th><th>$f_i x_i$</th></tr><tr><td>38 - 40</td><td>3</td><td>39</td><td>117</td></tr><tr><td>40 - 42</td><td>2</td><td>41</td><td>82</td></tr><tr><td>42 - 44</td><td>4</td><td>43</td><td>172</td></tr><tr><td>44 - 46</td><td>5</td><td>45</td><td>225</td></tr><tr><td>46 - 48</td><td>14</td><td>47</td><td>658</td></tr><tr><td>48 - 50</td><td>4</td><td>49</td><td>196</td></tr><tr><td>50 - 52</td><td>3</td><td>51</td><td>153</td></tr><tr><td>Total</td><td>$\sum f_i = 35$</td><td></td><td>$\sum f_i x_i = 1603$</td></tr></table> Mean = $\frac{\sum f_i x_i}{\sum f_i} = \frac{1603}{35} = 45.8 \text{ kg}$ Mean weight = 45.8 kg	Weight(in Kg)	f_i	x_i	$f_i x_i$	38 - 40	3	39	117	40 - 42	2	41	82	42 - 44	4	43	172	44 - 46	5	45	225	46 - 48	14	47	658	48 - 50	4	49	196	50 - 52	3	51	153	Total	$\sum f_i = 35$		$\sum f_i x_i = 1603$	1
Weight(in Kg)	f_i	x_i	$f_i x_i$																																			
38 - 40	3	39	117																																			
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Total	$\sum f_i = 35$		$\sum f_i x_i = 1603$																																			

	$\Rightarrow n/2 [2 \times 15 + (n-1)5] = 1250$ $\Rightarrow n(5n+25) = 2500$ $5n^2 + 25n - 2500 = 0$ $\Rightarrow n^2 + 5n - 500 = 0$ Solve quadratic equations $n = 20$ rows needed Total rows = 30 Rows left blank = $30 - 20 = 10$	$\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$
37	(i) $\tan 30^\circ = BC / 36$ $1/\sqrt{3} = BC / 36$ $BC = 36 \times \sqrt{3} / 3 = 12\sqrt{3} \text{ m}$ (ii) $\tan 45^\circ = AC / 36$ $1 = AC / 36$ $AC = 36 \text{ m}$ $AB = (36 - 12\sqrt{3}) \text{ m}$ (iii)(a) $\cos 45^\circ = 36/OA$ $1/\sqrt{2} = 36/OA$ $OA = 36\sqrt{2} \text{ m}$ (OR) (iii)(b) $\cos 30^\circ = 36/OB$ $\sqrt{3}/2 = 36/OB$ $OB = 24\sqrt{3} \text{ m}$	1 1 1 1 1 1
38	Given: A(3,4), B(6,7), C(9,4), D(6,1) (i) Distance between A and B: $AB = \sqrt{((6-3)^2 + (7-4)^2)}$ $= \sqrt{(3^2 + 3^2)} = \sqrt{18} = 3\sqrt{2} \text{ units}$ (ii) Distance between A and C: $AC = \sqrt{((9-3)^2 + (4-4)^2)} = \sqrt{36} = 6 \text{ units}$ (iii)(a) $AB = 3\sqrt{2} \text{ units}$ $AD = \sqrt{((6-3)^2 + (4-1)^2)}$ $= \sqrt{(3^2 + 3^2)} = \sqrt{18} = 3\sqrt{2} \text{ units}$ $AB = AD$ $\therefore A$ is equidistant from B and D (OR) (iii)(b) $AB = 3\sqrt{2}$, $AC = 6$, $AD = 3\sqrt{2}$, $CD = 3\sqrt{2}$ $BC = \sqrt{((9-6)^2 + (4-7)^2)}$ $= \sqrt{(3^2 + 3^2)} = \sqrt{18} = 3\sqrt{2}$ $BD = \sqrt{((6-6)^2 + (7-1)^2)}$ $= \sqrt{(0 + 6^2)} = 6$ $AB = BC = CD = DA$ and $AC = BD$ $\therefore$ It is a square	1 1 $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$