केंद्रीय विद्यालय संगठन ,जयपुर संभाग

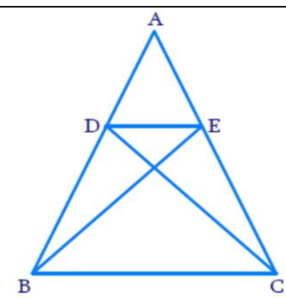
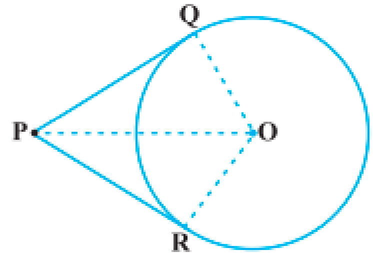
KENDRIYA VIDYALAYA SANGATHAN JAIPUR REGION

PRACTICE PAPER : 2024-25

सेट सं /SET No :-A

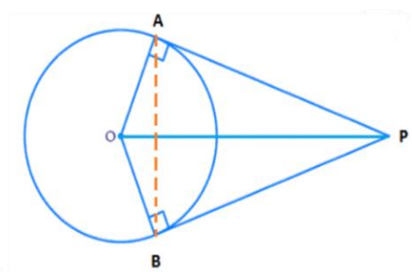
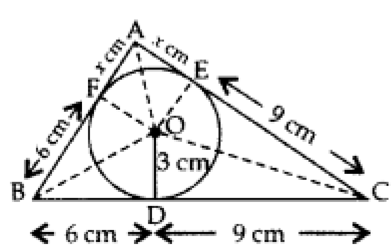
कक्षा/ Class: 10 विषय /SUBJECT- MATHS STANDRAD (041)

MARKSING SCHEME

Q..No.	Answers	Marks
1	(D)	1
2.	A	1
3.	(C)	1
4.	C	1
5.	A	1
6.	(A)	1
7.	(A)	1
8.	(A)	1
9.	D	1
10.	(B)	1
11.	D	1
12.	(A)	1
13.	(A)	1
14.	(C)	1
15.	D	1
16.	A	1
17.	A	1
18.	C	1
19.	B	1
20.	(B)	1
21.	In ΔABE and ΔACD AD = AE (ΔABE ≅ ΔACD given).......... (1) AB = AC (ΔABE ≅ ΔACD given)......... (2) Now Consider ΔADE and ΔABC AD/AB = AE/AC [From equations (1) and (2)] and ∠DAE = ∠BAC (Common angle) Thus, ΔADE ~ ΔABC (SAS criterion) 	1 1
22.	By comparing coefficients we have K= -3/2	1 1
23	**Let a circle with centre O and external point P.** **Two tangents PQ and PR are drawn.** **To prove : PQ=PR** **Construction: Join radius OQ and OR also join O to P.** **Proof : In △OQP and △ORP** **OQ=OR (Radii)** **∠ Q=∠R [Each 90∘,radius⊥tangents)]** **OP=OP (Common side)** **∴△OQP ≅△ORP (RHS Congruence rule.)** 	1 1

	By CPCT PQ=PR **Hence, proved.**	
24.	The area accessible to the goat can be calculated using the area of a sector of a circle. The area of the garden the goat can access is a circular sector: Radius = 10 m; Rope length = 4 m, so the accessible area is $\pi \times 4^2 = 16\pi$ m². The area accessible is 16π m² , which equals approximately 50.285 m². OR **Radius (r_1) of 1st circle = 8 cm** **Radius (r_2) of 2nd circle = 6 cm** **Let the radius of 3rd circle be *r*.** **Area of 1st circle** $= \pi r_1^2 = \pi(8)^2 = 64\pi$ **Area of 2nd circle** $= \pi r_2^2 = \pi(6)^2 = 36\pi$ **Given that,** **Area of 3rd circle = Area of 1st circle + Area of 2nd circle** $\pi r^2 = \pi r_1^2 + \pi r_2^2$ $\pi r^2 = 64\pi + 36\pi$ $\pi r^2 = 100\pi$ $r^2 = 100$ $r = \pm 10$ **However, the radius cannot be negative. Therefore, the radius of the circle having area equal to the sum of the areas of the two circles is 10 cm.**	1 1 1 1
25.	$\frac{\cos\theta - \sin\theta}{\cos\theta + \sin\theta} = \frac{1-\sqrt{3}}{1+\sqrt{3}}$ Taking $\cos\theta$ common from numerator and denominator in LHS $\frac{1-\tan\theta}{1+\tan\theta} = \frac{1-\sqrt{3}}{1+\sqrt{3}}$ Comparing both sides, $\tan\theta = \sqrt{3}$ **So** $\theta = 60°$ OR $\sin(A - B) = \frac{1}{2}$ and $\cos(A + B) = \frac{1}{2}$ $\Rightarrow (A - B) = 30°$ and $(A + B) = 60°$ On subtracting, we get, $2B = 30° \Rightarrow B = 15°$ And A= 45	1 1 1 1 1

26.	Let $\sqrt{2}+\sqrt{3}=\frac{p}{q}$ where p and q are integers. Then, $\sqrt{2}=\frac{p}{q}-\sqrt{3}$ Squaring both sides: $2=\frac{p^2}{q^2}-2.\frac{p\sqrt{3}}{q}+3$ Rearranging the terms gives a contradiction as one sides involve a rational number and other sides an irrational number($\sqrt{3}$). Thus $\sqrt{2}+\sqrt{3}$ is irrational. **Let the given polynomial be p(x) = 4**x^2 **-2**x **+(k-4)** **Given, α and** 1/α **are zeros of the given polynomial** **We know that product of zeroes =** c/a **(α ×**1/α **) =**(k−4)/4 ⇒ **1 =** (k−4)/4 ⇒ **4 = (k − 4)** ∴ **k = 8**	½ 1 1½ 1 1 1
27.		
28.	$\frac{\sin A-2\sin^3 A}{2\cos^3 A-\cos A}$ $=\frac{\sin A(1-2\sin^2 A)}{\cos A(2\cos^2 A-1)}$ $=\frac{\sin A(\sin^2 A+\cos^2 A-2\sin^2 A)}{\cos A(2\cos^2 A-\sin^2 A-\cos^2 A)}$ $=\frac{\sin A(\cos^2 A-\sin^2 A)}{\cos A(\cos^2 A-\sin^2 A)}$ $=\frac{\sin A}{\cos A}=\tan A$	1 1 1

29.	Let the fixed charge for the first three days be Rs. A and the charge for each day extra be Rs. B.	
	According to the information given,	
	$A + 4B = 27$ …………………………………………………… (i)	½
	$A + 2B = 21$ …………………………………………………….. (ii)	
	When equation (ii) is subtracted from equation (i) we get,	
	$2B = 6$	
	$B = 3$ ……………………………………………………………(iii)	1
	Substituting B = 3 in equation (i) we get,	
	$A + 12 = 27$	
	$A = 15$	1
	Hence, the fixed charge is Rs. 15.	½
	And the Additional charge per day is Rs. 3.	
30.	• Let us consider O as the centre point of the circle.	
	• Let P be a point outside the circle from which two tangents PA and PB are drawn to the circle which touches the circle at point A and B respectively.	
	• Draw a line segment between points A and B such that it subtends ∠AOB at centre O of the circle.	
	The tangent at any point of a circle is always perpendicular to the radius through the point of contact.	
	$\therefore \angle OAP = \angle OBP = 90°$ --- Equation (i)	1
	In a quadrilateral, the sum of interior angles is 360°.	
	∴ In OAPB,	
	 	
	$\angle OAP + \angle APB + \angle PBO + \angle BOA = 360°$	
	Using Equation (i), we can write the above equation as	1
	$90° + \angle APB + 90° + \angle BOA = 360°$	
	$\angle APB + \angle BOA = 360° - 180°$	
	$\therefore \angle APB + \angle BOA = 180°$	
	Where,	1
	∠APB = Angle between the two tangents PA and PB from external point P.	
	∠BOA = Angle subtended by the line segment AB joining the point of contacts at the centre.	
	OR	
	Joint: OA, OF, OE, OB and OC	
	 	
	Let AF = AE = x	
	BD = BF = 6 cm	
	CD = CE = 9 cm	
	$\therefore AB = AF + BF = x + 6$ …(i)	
	$AC = AE + CE = x + 9$ …(ii)	
	$BC = DB + CD = 6 + 9 = 15$ cm …(iii)	
	In ΔABC,	
	Area of $\Delta ABC = 54\ cm^2$ …[Given	
	$ar(\Delta ABC) = ar(\Delta BOC) + ar(\Delta AOC) + ar(\Delta AOB)$	

$\Rightarrow \quad \frac{1}{2} \times BC \times OD + \frac{1}{2} \times AC \times OD + \frac{1}{2} \times AB \times OD$

...[Area of Δ = ½ × Base × Height

$\Rightarrow \quad \frac{1}{2}[AB + AC + BC] \times OD = 54$

$\Rightarrow \quad \frac{1}{2}[x + 6 + x + 9 + 15] \times 3 = 54$

...[From (*i*), (*ii*) & (*iii*)

$\Rightarrow \quad \frac{1}{2}[2x + 30] \times 3 = 54$

$\Rightarrow \quad 6x + 90 = 108$

$\Rightarrow \quad 6x = 18$

$\Rightarrow \quad x = 3$

$\Rightarrow \quad AB = x + 6 = 3 + 6 = 9$ cm

$\Rightarrow \quad AC = x + 9 = 3 + 9 = 12$ cm

$\therefore$ **AB = 9 cm, AC = 12 cm**

31.	a) P(even) = ½ b) P(>75) = ¼ c) P(perfect cube) = 1/25	1 1 1
32.	Let the speed of the stream be x km/hr ∴ Speed of the boat upstream = (20 – x) km/hr and speed of the boat downstream = (20 + x) km/hr Given, Distance = 48 km According to the Question, $\frac{48}{20-x} - \frac{48}{20+x} = 1$ $\Rightarrow \frac{48[20+x-(20-x)]}{(20-x)(20+x)} = 1$ $\Rightarrow \frac{48[20+x-20+x]}{400-x^2} = 1$ $96x = 400 - x^2$ $\Rightarrow x^2 + 96x - 400 = 0$ $\Rightarrow x^2 + 100x - 4x - 400 = 0$ ⇒ x (x + 100) – 4 (x + 100) = 0 ⇒ (x – 4) (x + 100) = 0 ⇒ x – 4 = 0 or x + 100 = 0 ⇒ x = 4 or x = – 100 ….[Rejecting negative value as the speed cannot be -ve ∴ Speed of the stream = 4 km/hr OR Let the duration of the flight be x hours. According to the given, (600/x) – [600/(x + 1/2) = 200 (600/x) – [1200/(2x + 1)] = 200 [600(2x + 1) – 1200x]/ [x(2x + 1)] = 200 (1200x + 600 – 1200x)/ [x(2x + 1)] = 200 600 = 200x(2x + 1) x(2x + 1) = 3 $2x^2 + x - 3 = 0$ $2x^2 + 3x - 2x - 3 = 0$ x(2x + 3) – 1(2x + 3) = 0 (2x + 3)(x – 1) = 0 2x + 3 = 0, x – 1 = 0 x = -3/2, x = 1 Time cannot be negative. Therefore, x = 1 Hence, the original duration of the flight is 1 hr.	1 1 2 1 OR 2 1 1 1

33. a) Prove bpt theorem. 1

OR

ΔABC ~ ΔPQR 1

$$\frac{AB}{PQ} = \frac{BC}{QR} = \frac{AC}{PR}$$

or, $\frac{z}{3} = \frac{8}{6} = \frac{4\sqrt{3}}{y}$ 1

or, $\frac{z}{3} = \frac{8}{6}$ and $\frac{8}{6} = \frac{4\sqrt{3}}{y}$

or, $z = \frac{8\times 3}{6}$ and $y = \frac{4\sqrt{3}\times 6}{8}$

∴ $z = 4$ and $y = 3\sqrt{3}$

∴ $y + z = 3\sqrt{3} + 4$

34. The volume V of the original cone is given by: 5

V= $\frac{1}{3}\pi r^2 h = \frac{1}{3}\pi 4^2(9) = 48\pi\ cm^3$

Volume of the smaller cone:

Radius: 2cm, height= 4.5cm (half of original)

$V_{small} = \frac{1}{3}\pi 2^2(4.5) = 6\pi\ cm^3$

Remaining Volume:

$V_{remaining} = V - V_{small} = 48\pi - 6\pi = 42\pi cm^3$

CSA of the remaining cone:

CSA of a cone: $\pi r l = \pi(4)\sqrt{97}$ $(\because l = \sqrt{4^2 + 9^2} = \sqrt{97})$

35.

Class	Frequency	Cumulative Frequency
65-85	4	4
85-105	x	4 + x
105-125	13	17+ x
125-145	20	37+ x
145-165	14	51+ x
165-185	y	51 + x + y
185-205	4	55 + x + y

Median class is "125–145." cf = 17 + x , l = 125 , f = 20 h = 20, N = 68

Median = l + $\left(\frac{\frac{N}{2} - cf}{f}\right)$ x h

⇒ 137 = 125 + $\left(\frac{34 - 17 - x}{20}\right)$ x 20

⇒ 137 – 125 = 17 – x

⇒ x = 17 – 12 = 5 ⇒ 55 + 5 + y = 68 ⇒ y = 8

36.	a) AB = $\sqrt{73}$ and BC = $\sqrt{104}$ b) AC = $\sqrt{(8-2)^2+(-4-3)^2}=\sqrt{85}$ d) M(5, -0.5) Or Coordinates of Centroid = $(\frac{20}{3}, \frac{5}{3})$	1 1 2
37.	a) Using $tan\theta = \frac{opposite}{adjacent} = \frac{6m}{6m}$ tan$\theta = 1$, so $\theta = 45°$. b) New height = 6 + 2 = 8 meters. So $tan\theta = \frac{8}{x}$ and $\theta = 60°$, since the angle of elevation is 60°. $tan60° = \sqrt{3} = \frac{8}{x} \Rightarrow x = \frac{8}{\sqrt{3}} = \frac{8\times\sqrt{3}}{3} \approx 4.61\ meters.$ c) Using $tan30° = \frac{h}{6}$, $\frac{1}{\sqrt{3}} = \frac{h}{6} \Rightarrow h = \frac{6}{\sqrt{3}}$ = $2\sqrt{3}$ meters Thus The height of the roof from thr ground = 6+ $2\sqrt{3}$ = 6+ 3.46= 9.46m **OR** **When** base is same for both towers and their heights are given, i.e., x and y respectively.Let the base of towers be k. $\tan 30° = \frac{x}{k}$, $x = k \tan 30° = \frac{k}{\sqrt{3}}$ ...(i) | $\tan 60° = \frac{y}{k}$, $y = k \tan 60° = k\sqrt{3}$ ...(ii) From equations (i) and (ii), $\frac{x}{y} = \frac{\frac{k}{\sqrt{3}}}{k\sqrt{3}} = \frac{k}{\sqrt{3}} \times \frac{1}{k\sqrt{3}} = \frac{1}{3} = \mathbf{1 : 3}$	1 1 2
38.	a) Annual increase = 20 By the fifth year, the number of wooden chairs produced will be : 150+(5-1) × 20 = 150+ 80= 230 chairs. b) Annual increase = 30 chairs. Solving for the number of years: 250+ (n-1) × 30 = 400 (n-1) ×30 = 150 n-1 = 5 n= 6 Therefore, the production will reach 400 chairs in the 6^{th} year. c) sum of plastic chairs produced over 4 years: 250+280+310+340 = 1180 chairs sum of wooden produced over 4 years: 150+170+190+210 =72 0 chairs Overall total chairs = 720 + 1180 = 1900 chairs. **OR**	1 1 2

	203, 210, 217, …, 497 Here a = 203, d = 210 – 203 = 7, an = 497 ∴ a + (n – 1) d = an 203 + (n – 1) 7 = 497 (n – 1) 7 = 497 – 203 = 294 n – 1 = 2947 = 42 ∴ n = 42 + 1 = 43 ∴ There are 43 natural nos. between 200 and 500 which are divisible by 7.	