CHENNAI SAHODAYA SCHOOL COMPLEX

PRE-BOARD COMMON EXAMINATION - 2020

STANDARD MATHEMATICS - SET - I

Class : X Std - SCORING KEY

SECTION – A

1. r = 0 , 1 , 2 (2 , 5) (S) (Q)
2. not defined or 0
3. -2
4. PR = 10cm
5. Centroid (2-1)
6. (a) 6
7. (d) 10x – 14y = -4 (2-8)
8. (b) 39 (2-7)
9. (b) 60cm (2-13)
10. (a) -12 (2-14)
11. (b) Both A and B are correct and B is correct explanation for A (2-12)
12. (b) 30 (2-9)
13. (d) 16 : 9 (2-10)
14. (c) 11.5 (2-11)
15. (d) $\frac{25}{36}$
16. Any rational number and irrational numbers
17. $3\sqrt{3}$ cm (Or) P (ΔABC) = 20cm
18. $b^2 x^2 + a^2 y^2 = a^2 b^2$
19. x = 20°
20. K = -3

SECTION – B

21. a = 12 l = 204 **(½)** d = 4

$n = \frac{l-a}{d} + 1$ **(½)** $= \frac{204-12}{4} = \frac{192}{4} = 48$ **(1)**

22. g.t. $\Delta ABC \cong \Delta PQR$ and ar (ΔABC) = ar (ΔPQR) —— (1)

$\Rightarrow \frac{ar(ABC)}{ar(PQR)} = \left(\frac{AB}{PQ}\right)^2 = \left(\frac{BC}{QR}\right)^2 = \left(\frac{AC}{PR}\right)^2$ **(½)**

Using (1) $1 = \frac{AB}{PQ} = \frac{BC}{QR} = \frac{AC}{PR}$ **(½)**

$\Rightarrow$ AB = PQ , BC = QR , AC = PR **(½)**

by SSS congruence, $\Delta ABC \cong \Delta PQR$ **(½)**

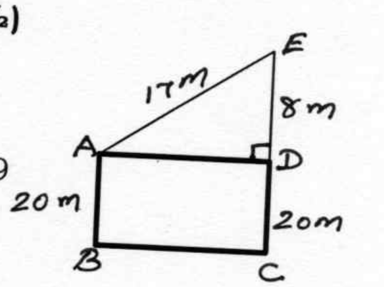
23. In right ΔADE

$AE^2 = AD^2 + ED^2$

$17^2 = AD^2 + 8^2$ **(½)**

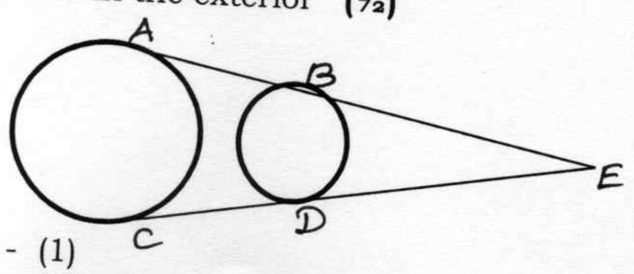
$AD^2 = 17^2 - 8^2 = (17+8)(17-8) = 25 \times 9$

$AD = \sqrt{25 \times 9} = 5 \times 3 = 15$cm **(1)**



(½)

24. Take a point E in the exterior **(½)**



AE = CE - (1)

BE = DE - (2) **(½)**

(Tangents draw from an external point to a circle an equal) **(½)**

AE – BE = CE – DE

$\Rightarrow$ AB = CD **(½)**

25. Hemisphere : r_1 = 9cm , Cone : h = 72 Radius = r_2

V. of cone = V. of hemisphere **(½)**

$\frac{1}{3}\pi r_2^2 h = \frac{2}{3}\pi r_1^3$ **(½)**

$r_2^2 \times 72 = 2 \times 9 \times 9 \times 9$ **(½)**

$r_2^2 = \frac{2 \times 9 \times 9 \times 9}{72 \quad 36 \quad 4}$

$r_2 = \frac{9}{2} = 4.5$cm **(½)**

26. $\frac{5 + 10 + P + 3 + 7 + 8}{5} = 8$ **(½)**

33 + P = 40 **(½)**

P = 40 - 33 = 7 **(1)**

(Or)

$\frac{\Sigma xi}{8} = 152$ **(½)**

$\Sigma xi = 1216$ **(1)**

$\frac{1216 + 143 + 156}{10} = \frac{1515}{10} = 151.5$cm **(½)**

New mean height = 151.5 cm

SECTION – C

27. n (S) = 6

(a) P(E) = $3/6 = 1/2$ **(1)**

(b) P(E) = $1/6$ **(1)**

(c) P(E) = $1/6$ **(1)**

(Or)

n(s) = $\frac{101-1}{2} + 1 = 51$ **(1)**

(a) P(E) = $\frac{9}{51} = \frac{3}{17}$ **(1)**

(b) P(E) = $\frac{7}{51}$ **(1)**

28. From rectangle , a quarter circle BFEC and a semi circle DGE are removed

Area of remaining piece of rectangle = Area of Parallelogram ABCD – ar4 (quarter) + ar (semicircle) **(½)**

$= \ell b - \left[\frac{1}{4}\pi r_1^2 + \frac{1}{2}\pi\, _2^2\right]$ **(½)**

$= 14 \times 7 - \Pi \left[\frac{1}{4} \times (7)^2 + \frac{1}{2} \times (7)^2\right]$

$= 98 - \frac{22}{7} \times \frac{147}{8} = \frac{161}{4}$ **(1)**

= 40.25 cm^2

Some suggestive opinions

Example sincere , active , good user of sources etc., **(1)**

29. After rearranging

$$\frac{1}{\cos ec\theta - \cot\theta} + \frac{1}{\cos ec\theta + \cot\theta} = \frac{1}{\sin\theta} + \frac{1}{\sin\theta} \quad \textbf{(1)}$$

$$\text{L.H.S} = \frac{\cos ec\theta + \cot\theta + \cos ec\theta - \cot\theta}{(\cos ec\theta - \cot\theta)(\cos ec\theta + \cot\theta)} \quad \textbf{(1)}$$

$$= \frac{2\cos ec\theta}{\cos ec\theta - \cot\theta} = 2\text{cosec}\theta = \frac{2}{\sin\theta} = \text{R.H.S.} \quad \textbf{(1)}$$

$$\text{L.H.S} = \frac{\cos A - \sin A + 1}{\cos A + \sin A - 1} \quad (\div \sin A)$$

$$= \frac{\cot A - 1 + \cos ecA}{\cot A + 1 - \cos ecA} \quad \textbf{(1)}$$

$$= \frac{(\cot A + \cos ecA) - 1}{(\cos A + 1 - \cos ecA)} \quad \left[\text{cosec}^2A - \cot^2A = 1\right]$$

$$= \frac{(\cot A + \cos ecA) - (\cos ecA - \cot A)}{\cot A + 1 - \cos ecA} \quad \textbf{(1)}$$

$$= \frac{(\cot A + \cos ecA) - (1 - (\cos ecA - \cot A)}{\cot A + 1 - \cos ecA} \quad \textbf{(1)}$$

$$= \frac{(\cot A + \cos ecA) - (1 - (\cos ecA + \cot A)}{\cot A + 1 - \cos ecA}$$

= cotA + cosec A = R.H.S

30. Co-ordinate of P = $\left(\frac{2+5}{2}, \frac{-1-6}{2}\right) = \left(\frac{7}{2} \quad \frac{-7}{2}\right)$ **(1)**

P lies on 2x + 4y + k = 0

$2 \times \frac{7}{2} + 4 \times \frac{-7}{2} + K = 0$ **(1)**

7 – 14 + K = 0 **(1)**

K = 7

31. $a_n = 2n + 1$

If n = 1 $a_1 = 2 + 1 = 3$
If n = 2 $a_2 = 4 + 1 = 5$ **(1)**
If n = 3 $a_3 = 5 + 1 = 7$

(S) (Q)
(3 - 33)

AP is 3, 5 , 7 , ... a = 3 d = 2

$S_n = \frac{n}{2}\left[2a + (n-1)d\right]$ **(½)**

$= \frac{n}{2}\left[2 \times 3 + (n-1)2\right] = \frac{n}{2} \times 2\left[3 + n - 1\right]$ **(½)**

$= n(n + 2) = n^2 + 2n$ **(1)**

32. We know that, the opposite angles of a cyclic quadrilateral are supplementary

$\angle A + \angle C = 180° \rightarrow 6x + 10 + x + y = 180°$

$7x + y = 170°$ ——— (1) **(½)**

$\angle B + \angle D = 180° \rightarrow 5x + 3y - 10 = 180°$

$5x + 3y = 190°$ ——— (2) **(½)**

On multiplying (1) by 3 and subtracting ( ) from it

$\rightarrow 16x = 320°$ $x = 20°$ **(½)** $y = 30°$ **(½)**

$\angle A = 130°$, $\angle B = 100°$ **(½)** , $\angle C = 50°$, $\angle D = 80°$ **(½)**

(Or)

$\frac{1}{x+y} = a \quad \frac{1}{x-y} = b$ **(½)**

2a + 5b = 3 ——— (1)

7a - 2b = 4 ——— (2)

$\rightarrow P = \frac{2}{3}$ **(½)** $q = \frac{1}{3}$ **(½)**

$\frac{1}{x+y} = \frac{2}{3} \rightarrow 2x + 2y = 3$ ——(3) $\frac{1}{x-y} = \frac{1}{3}$ **(1)** $x - y = 3$ —— (4)

After solving (3) and (4)

$x = \frac{9}{4}$ $y = \frac{-3}{4}$ **(½)**

33. $\alpha = -3$ $\beta = -2$

$\alpha + \beta = -5$

$\alpha\beta = 6$

(S) (Q)

(3 - 31)

$g(x) = x^2 + 5x + 6$ **(1)**

$$
\begin{array}{r|l}
 & 2x^2 - 7 \ \textbf{(1)} \\
x + 5x + 6 & 2x^4 + 10x^3 + 5x^2 - 35x - 42 \\
 & 2x^4 + 10x^3 + 12x^2 \\
 & \qquad - 7x^2 - 35x - 42 \\
 & \qquad - 7x^2 - 35x - 42 \\
 & \qquad\qquad 0
\end{array}
$$

$2x^2 - 7 = 0$ $2x^2 = 7$ $x = \pm\sqrt{7/2}$

Other zeroes are $\sqrt{7/2}$, $-\sqrt{7/2}$ **(1)**

34. Proof

(Or)

HCF (144, 180) = 36 **(1)**

13m – 16 = 36 **(1)**

13m = 52 **(1)**

$m = \frac{52}{13} = 4$

SECTION – D

35. $t_1 = \frac{400}{x}$ $t_2 = \frac{400}{x+12}$

$t_1 - t_2 = 1\frac{40}{60}$ **(1)**

$\frac{400}{x} - \frac{400}{x+12} = \frac{5}{3}$ **(½)**

$400\left(\frac{x+12-x}{x(x+12)}\right) = \frac{5}{3}$ **(½)**

$\rightarrow 5x^2 + 60x - 14400 = 0$ **(½)** $\rightarrow$ $x^2 + 12x - 2880 = 0$ $\rightarrow (x - 48)(x+60) = 0$ **(½)**

x = 48 x = -60 (impossible)

Original speed of car 48km/hr **(½)**

(Or)

$\frac{1}{x} - \frac{1}{x-2} = 3$

$\frac{x-2-x}{x(x-2)} = 3$ **(1)** $\rightarrow$ $-2 = 3x(x - 2)$

$3x^2 - 6x + 2 = 0$ **(1)**

$b^2 - 4ac = (-6)^2 - 4 \times 3 \times 2$

$= 36 - 24 = 12$ **(1)**

$x = \frac{6 \pm \sqrt{12}}{2x3} = \frac{6 \pm 2\sqrt{3}}{6} = \frac{2(3 \pm \sqrt{3})}{63}$

$x = \frac{3 \pm \sqrt{3}}{3}$ **(1)**

(S) (Q)
(3 - 40)

36. In right ΔCDB

$\sin 30° = \frac{CD}{BD}$ **(1)**

$\frac{1}{2} = \frac{CD}{100}$ CD = 50

CE + ED = CD (ED = GA = 20)

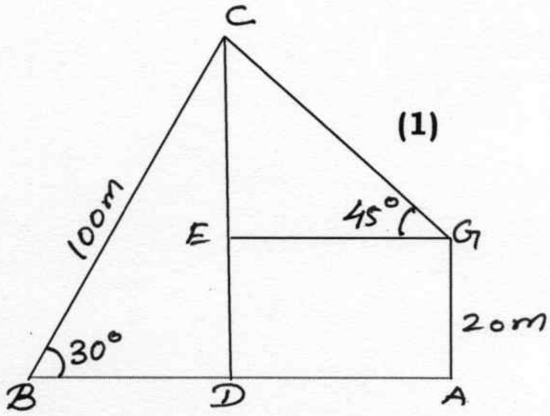
CE + 20 = 50

CE = 30m **(1)**

In right ΔCEG $\sin 45° = \frac{CE}{CG}$ **(1)**

$\frac{1}{\sqrt{2}} = \frac{30}{CG}$

CG = 30 √2m



(1)

wrong figure ⟶ no mark

37. Basic triangle **(1)**

Similar triangle **(2)** Verification **(1)**

(Or)

Basic Circle **(1)**

Construction of 90° line **(3)**

38. $r = \frac{12}{2} = 6cm$

V(Sphere) = $\frac{4}{3}\Pi r^3 = \frac{4}{3} \times \frac{22}{7} \times 6^3 = 905.14cm^3$ **(1)**

V(Sphere) = V (water in cylindrical vessel) **(1)**

$905 - 14 = \Pi r^2 \times \frac{32}{9}$

$r^2 = \frac{905.14x9x7}{22x32} = 81$ cm **(1)**

r = √81 = 9cm **(½)**

Diameter = 18cm **(½)**

(Or)

Radius , $r = \frac{14}{2} = 7$cm , h (cone) = 8 cm **(½)**

Internal radius of hollow sphere be x

V (cone) **(½)** = V (hollow sphere) **(1)**

$\frac{1}{3} \times \frac{22}{7} \times 49 \times 8 = \frac{4}{3} \times \frac{22}{7}(125 - x^3)$ **(1)**

$392 = 4 (125 - x^3)$

$x^3 = \frac{108}{4} = 27$ x = 3 **(½)**

Internal diameter = 2 x 3 = 6 cm **(½)**

39. Drawing ogive **(2)**

Finding median in graph **(1)**

Using formula **(1)**

40. Given, to find, figure construction **(2)**

Proof **(2)**

(S) (Q)
(3 - 36)

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