CHENNAI SAHODAYA SCHOOL COMPLEX

PRE-BOARD COMMON EXAMINATION - 2020

BASIC MATHEMATICS - SET - I

Class : X Std

SCORING KEY

SECTION – A

1. 10
2. -14
3. (0,7) OR (0, -7) (any one)
4. 6cm
5. 1
6. False
7. True
8. True
9. False
10. False
11. C – unique solu.
12. (a) $\frac{12}{13}$
13. (b) -3
14. (c) A is true and B is false
15. (b) 1
16. 1 : 3
17. 13cm
18. $\frac{2}{\sqrt{13}}$
19. a^2b
20. x = 1,4

SECTION – B

21. a = 3 d = 5

$a_n = 78$ $a + (n-1)d = 78$ **(½)**

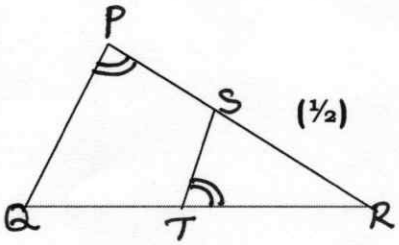
$3 + (n-1)\,5 = 78$

$3 + 5n - 5 = 78$ **(1)**

$5n = 80$ $n = 16$

22. $\angle R$ is (common)

$\angle P = \angle RTS$ (given) **(1½)** by AA similarity $\Delta RPQ \cong \Delta RTS$



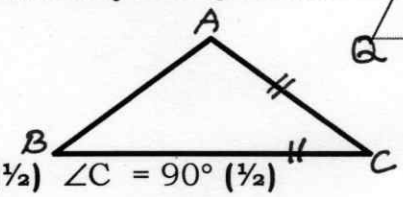
(½)

(Or)

g.t. $AB^2 = 2AC^2$

$= AC^2 + AC^2$ (AC = BC)

$= AC^2 + BC^2$ **(1)**



by converse of Pythagoras theorem **(½)** $\angle C = 90°$ **(½)**

Δ ABC is right angled triangle.

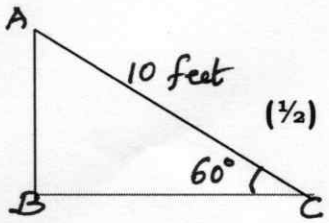
23. In the quadrilateral PROQ **(1)**

$\angle P + \angle Q + \angle R + \angle QOR = 360° \longrightarrow \angle P = 360 - 120 - 90 - 90 = 60°$ **(1)**

24. $\cos 60° = \frac{BC}{AC}$ **(1)**

$\frac{1}{2} = \frac{BC}{10}$ **(½)**

BC = 5 feet.

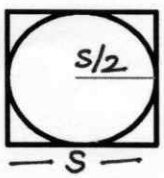


(½)

25. r (sphere) $= \frac{S}{2}$ **(½)**

$V(\text{sphere}) = \frac{4}{3}\pi r^3 = \frac{4}{3}\pi \left[\frac{S}{2}\right]^3$ **(1)**

$= \frac{\pi S^3}{6}$ cubic unit. **(½)**



26.

score	cf (1)
0 - 10	10
10 - 20	22
20 - 30	30
30 - 40	52
40 - 50	82
50 - 60	92

n = 92 $n/2$ = 46 **(½)**

Median class = 30 – 40 **(½)**

SECTION – C

27. Required distance is LCM (40 , 424, 45) **(1)**
LCM = 2520 **(1 ½)**
Distance is 25m 20cm **(½)**
(Or)
HCF (441 , 567) 567 = 1 X 441 + 126
441 = 3 X 126 + 63 **(1 ½)**
126 = 2 X 63 + 0
HCF = 63
Next HCF 63 = 693 **(1)**
693 = 11 x 63 + 0
HCF (441 , 567, 693) = 63

28. $x^2 + 4x - 21 = x^2 - 3x + 7x - 21$ **(1)**
$= (x - 3)(x + 7)$
$\alpha = 3 \quad \beta = -7$
$\alpha + \beta = -4$ **(1)**
$\alpha\beta = -21$

$x + 4x - 21$
$\alpha + \beta = -b/a = -4$ **(1)**
$\alpha\beta = c/a = -21$

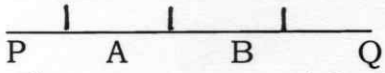
29. Cost of a pen ₹ x a pencil is ₹ y
$4x + 4y = 100 \rightarrow x + y = 25$ _____ (1) **(½)**
$3x = y + 15 \rightarrow 3x - y = 15$ _____ (2) **(½)**
After solving x = 10 y = 15 **(1 ½)**
Cost of pen is ₹ 10 and Cost of pencil is ₹ 15 **(½)**
(Or)
$3x - 4y - 20 = 0$
$x - 3y - 15 = 0$

$$\frac{x}{60-60} = \frac{y}{-20+45} = \frac{1}{-9+y}$$ **(2)**

x = 0 y = - 5 **(1)**

30. a =5 $a_{101} = -995$ **(½)**
$a + 100d = -995$
$5 + 700d = -995$ $100d = -1000$ $d = -10$ **(1 ½)**
$a_{51} = a + 50d = 5 + 50 \times -10 = 5 - 500 = -495$ **(1)**

31.



(0 , -5) (-3 , 4)

A divides PQ in the ratio 1 : 2

Co-ordinate of A $= \left(\frac{m_1x_2 + m_2x_1}{m_1 + m_2} \quad \frac{m_1y_2 + m_2y_1}{m_1 + m_2} \right)$ **(1 ½)**

$= (-1 , -2)$

Now B is the mid point of AQ

Co-ordinate of B $= \left(\frac{x_1 + x_2}{2} , \frac{y_1 + y_2}{2} \right)$ **(1 ½)**

$= (-2 , 1)$

32. $\cot\theta = \frac{4}{3}$

$$\frac{5\sin\theta - 3\cos\theta}{5\sin\theta + 3\cos\theta} = \frac{\frac{5\sin\theta - 3\operatorname{cosec}}{\sin\theta}}{\frac{5\sin\theta + 3\operatorname{cosec}}{\sin\theta}} \quad \textbf{(1)}$$

$$\frac{5 - 3\cot\theta}{5 + 3\cot\theta} = \frac{5 - 3 \times \frac{4}{3}}{5 - 3 \times \frac{4}{3}} \quad \textbf{(1)} \quad = \frac{5 - 4}{5 - 4} = \frac{1}{9} \quad \textbf{(1)}$$

(Or)

LHS $= (\sin A + \operatorname{Cosec} A)^2 + (\cos A + \operatorname{Sec} A)^2$

$= \sin^2A + 2 \sin A \operatorname{cosec} A + \operatorname{cosec}^2A + \cos^2A + 2\cos A \sec A + \sec^2A$ **(1)**

$= \sin^2A + \cos^2A + 2\sin A \times \frac{1}{\sin A} \; 2\cos A \times \frac{1}{\cos A} + 1 + \cot^2A + 1 + \tan^2A$ **(1)**

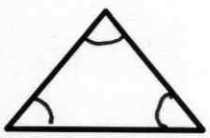
$= 1 + 2 + 2 + 2 + \cot^2A + \tan^2A = 7 + \tan^2A + \cot^2A = \text{R.H.S}$ **(1)**

33. This is an equilateral triangle of side 20m so, $\theta = 60°$

Area of three sectors

$= \frac{60}{360} \times \frac{22}{7} \times 7 \times 7 = 77m^2$

(S) (Q) 2-28 (S) (Q) 3-33



34.

Marks	No. of students (f)	Mid value (x) **(1)**	fx **(1)**
10-20	7	15	105
20-30	12	25	300
30-40	18	35	630
40-50	13	45	585
	$\Sigma f = 50$		$\Sigma fx = 1620$

Mean $= \frac{\Sigma fx}{\Sigma f} = \frac{1650}{50} = 32.4$ **(1)**

SECTION – D

35. If x = 3 is a solution.

$(k+2)3^2 - kx3 + 6 = 0$ **(1)** $\longrightarrow$ $k = -4$ **(1)**

Substituting k = -4 in the given equ.

$-2x^2 + 4x + 6 = 0$ **(1)**

$x^2 - 2x - x = 0$

$(x - 3)(x + 1) = 0$ $\quad x = 3 , -1$ **(½)**

Other root is -1 **(½)**

$9x^2 - 15x + 6 = 0$ **(½)**

$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} = \frac{15 \pm \sqrt{225 - 216}}{18}$ **(1 ½)**

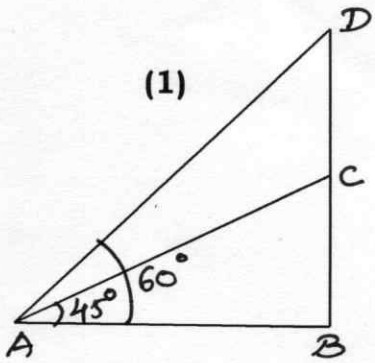
$= \frac{15 \pm 3}{18}$ **(1)** $= 1$ or $\frac{2}{3}$ **(1)**

36. Given, To prove, diagram construction (2) (S) (Q) (3 - 39)
Proof (2)

37. Construction of base triangle **(1 ½)** (S) (Q) (3 - 38)

Similar Triangle **(2)**
Verification **(½)**
(Or)
Circle
Tangents
Verification

38. BC – Building
CD – Flag Post (S) (Q) (3 - 36)



InΔACB = $\tan 45 = \frac{CB}{8}$ **(1)**

CB = 8

In Δ DAB = $\tan 60 = \frac{BD}{AB}$ **(1)**

$BD = 8\sqrt{3}$ **(½)**
$CD = DB - CB = 8\sqrt{3} - 8 = 5.84m$ **(½)**
Wrong diagram (no mark)
height of the flag = 5.84m } **(½)**
height of the building = 8m

39. Given, To prove , diagram **(1 ½)** (S) (Q) (3 - 37)
Proof **(2 ½)**

40. n(S) = 52

(a) P (king or queen) = $\frac{8}{52} = \frac{2}{13}$ **(1)**

(b) P (black card) = $\frac{26}{52} = \frac{1}{12}$ **(1)**

(c) P (neither King nor Queen)

= 1 – P (King or Queen) = $1 - \frac{2}{13} = \frac{11}{13}$ **(1)**

(d) P (not getting ace) = $\frac{48}{52} = \frac{12}{13}$ **(1)**