SETHU BHASKARA MATRIC · HR · SEC · SCHOOL

X - STD PRE - HALF YEARLY EXAM - NOV - 2018

MATHEMATICS ANSWER KEY

I CHOOSE

1. MA
2. a) α
3. d) $x^2-5x+6=0$
4. d) 45°
5. a) 7
6. d) 60°
7. b) 5 cm
8. c) 5 cm
9. b) $36\pi\,cm^3$
10. b) $2\pi\,cm^2$
11. b) $\frac{3}{4}$ cm
12. d) $(n+1)\bar{x}$
13. d) 10
14. d) 0
15. a) 0.39

SECTION - B

16. $b^2-4ac = (-2\sqrt{6})^2-4(3)(2)$ — 1

$= 4(6)-24=0$ — 1

roots are real and equal.

17. $\alpha+\beta=2,\ \alpha\beta=\frac{4}{3}$ — 1

$\alpha^2+\beta^2 = (2)^2-2(\frac{4}{3})$

$= \frac{4}{3}$ — 1

18. given lines are parallel.

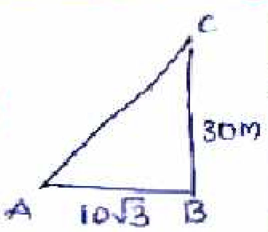
$\frac{a_1}{a_2}=\frac{b_1}{b_2} \Rightarrow \frac{1}{a} = \frac{-\frac{1}{2}}{-3}$ — 1

$\Rightarrow \boxed{a=6}$ — 1

19. $m_1=\frac{3}{5},\quad m_2=-\frac{5}{3}$ — 1

$m_1\times m_2 = \left(\frac{3}{5}\right)\left(-\frac{5}{3}\right) = -1$ — 1

20. In ΔCAB



$\tan\theta = \frac{30}{10\sqrt{3}}$ — 1

$\tan\theta=\sqrt{3}$

$\theta = 60^\circ$ — 1

21. $r_1 : r_2 = 3:5$

CSA $= 2\pi r_1^2 : 2\pi r_2^2$

$= 9:25$ — 1

TSA $= 3\pi r_1^2 : 3\pi r_2^2$

$= 9:25$ — 1

22. $\frac{4}{3}\pi(R^3-r^3) = \frac{11352}{7}$

$\frac{4}{3}\times\frac{22}{7}\times(8^3-r^3) = \frac{11352}{7}$ — 1

$\Rightarrow 512-r^3 = 387$

$r^3 = 125 \Rightarrow \boxed{r=5}$ — 1

23. $2\pi r = 44 \Rightarrow \boxed{r = 7\,cm}$ — 1

$V = \frac{1}{3}\pi r^2 h = \frac{1}{3}\times\frac{22}{7}\times 7^2\times 12$

$= 616\,cm^3$ — 1

24. $R = L-S \Rightarrow 59-23 = 36$ — 1

$C.R = \frac{36}{82} = 0.44$ — 1

25. $57 = \frac{6.84}{\bar{x}}\times 100$ — 1

$\bar{x} = \frac{684}{57} = 12$ — 1

26. $n(S) = 36$

$A = \{(3,6)(4,5)(5,4)(6,3)\}$ — 1

$P(A) = \frac{4}{36}$ (or) $\frac{1}{9}$ — 1

27. $n(S) = 4$

$A = \{HT, TH, TT\}$ — 1

$n(A) = 3$

$P(A) = \frac{3}{4}$ — 1

28 $n(S) = 216$

$A = \{(1,1,1)(2,2,2)(3,3,3)(4,4,4)(5,5,5)(6,6,6)\}$ — 1

$n(A) = 6$

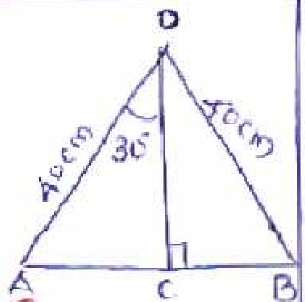
$P(A) = \frac{6}{216}$ (or) $\frac{1}{36}$ — 1

29 $\sqrt{x^4 + \frac{1}{x^4} + 2} = \sqrt{x^2 + \left(\frac{1}{x^2}\right)^2 + 2(x^2)\left(\frac{1}{x^2}\right)}$ — 1

$= \sqrt{\left(x^2 + \frac{1}{x^2}\right)^2}$

$= \left|x^2 + \frac{1}{x^2}\right|$ — 1

30 (a)



$\sin 30° = \frac{AC}{OA}$

$AC = OA \sin 30°$

$= 40 \times \frac{1}{2}$

$= 20\,cm$ — 1

$\therefore AB = 2 \times 20 = 40\,cm$ — 1

(b) $PA \times PB = PC \times PD$

$\Rightarrow 9 \times 4 = (x+2) \times 2$ — 1

$\Rightarrow x + 2 = 18$

$\boxed{x = 16}$ — 1

SECTION – C

31

$$\begin{array}{r|l}
 & 3x^2 + 2x + 4 \\
3x^2 & 9x^4 + 12x^3 + 28x^2 - nx + m \\
 & 9x^4 \\
6x^2 + 2x & 12x^3 + 28x^2 \\
 & 12x^3 + 4x^2 \\
6x^2 + 2x + 4 & 24x^2 - nx + m \\
 & 24x^2 + 16x + 16 \\
 & (0)
\end{array}$$

— 1, — 2, — 1

$m = 16,\ n = -16$ — 1

32 $\alpha + \beta = \frac{p}{5},\ \alpha\beta = \frac{1}{5}$ — 1

$\alpha - \beta = 1$ (given)

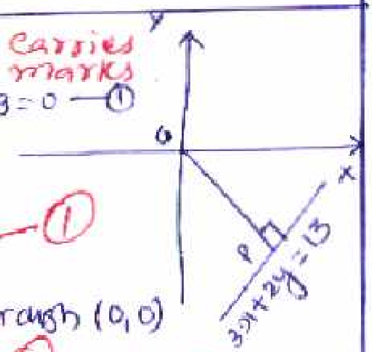
$(\alpha - \beta)^2 = (\alpha + \beta)^2 - 4\alpha\beta$ — 1

$\Rightarrow \frac{p^2}{25} - \frac{4}{5} = 1$ — 1

$p^2 - 20 = 25 \Rightarrow p^2 = 45$ — 1

$\boxed{p = \pm 3\sqrt{5}}$ — 1

33 Any method carries marks



$OP \perp 3x + 2y - 13 = 0$ — ①

$\therefore$ eq. of OP

$2x - 3y + k = 0$ — 1

it is passing through (0,0)

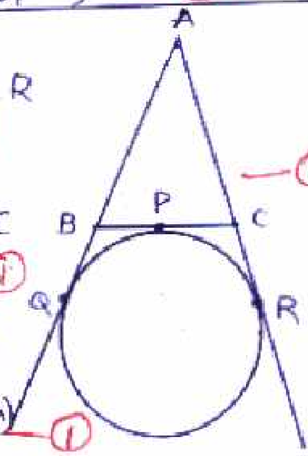
$\Rightarrow \boxed{k = 0}$ — 1

$\therefore$ eq of OP $\Rightarrow 2x - 3y = 0$ — ② — 1

by solving ① & ② $x = 3,\ y = 2$ — 1

we get $P(3, 2)$ — 1

34



— 1

$BQ = BP,\ CP = CR$

$AQ = AR$ — 1

perimeter of ΔABC

$= AB + BC + CA$ — 1

$= AB + BP + PC + CA$

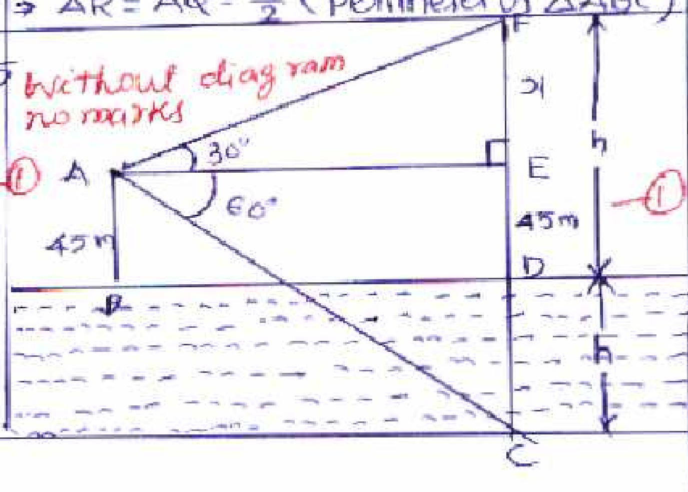
$= (AB + BP) + (PC + CA)$ — 1

$= (AB + BQ) + (CR + CA)$

$= AQ + AR \Rightarrow AR + AR = 2AR$ — 1

$\Rightarrow AR = AQ = \frac{1}{2}$ (perimeter of ΔABC)

35 without diagram no marks



— 1

In ΔFAE $\tan 30° = \dfrac{h-45}{AE}$

$\Rightarrow AE = (h-45)\sqrt{3}$ — (1)

In ΔACE $\tan 60° = \dfrac{EC}{AE} = \dfrac{ED+DC}{AE}$

$AE\sqrt{3} = 45+h$ — (1)

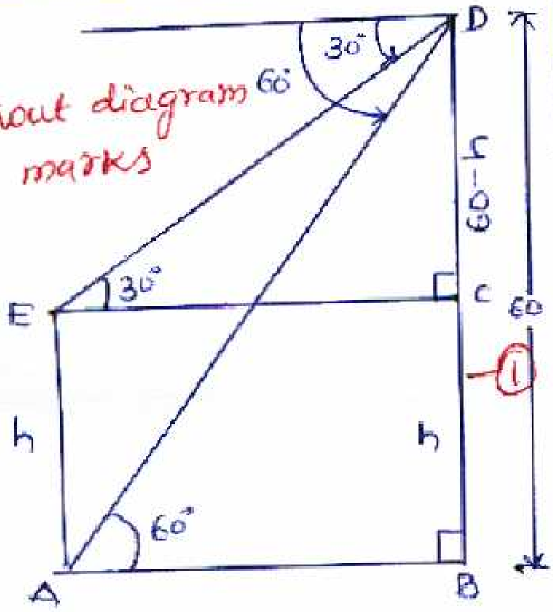
$\Rightarrow h = AE\sqrt{3} - 45$

$= (h-45)3 - 45$ — (1)

$h = 3h - 180$ — (1)

$2h = 180 \Rightarrow \boxed{h = 90\,m}$

36



without diagram no marks

— (1)

In ΔDAB

$\tan 60° = \dfrac{BD}{AB}$ (1)

$\Rightarrow AB = \dfrac{60}{\sqrt{3}}$ — (1)

In ΔDEC

$\tan 30° = \dfrac{CD}{EC}$

$\Rightarrow EC = \dfrac{CD}{\tan 30°}$ — (1)

$\Rightarrow AB = (60-h)\sqrt{3}$ $[EC = AB]$

$\Rightarrow (60-h)\sqrt{3} = \dfrac{60}{\sqrt{3}}$ — (1)

$\Rightarrow 60 - h = \dfrac{\cancel{60}^{20}}{\cancel{3}}$

$\boxed{h = 40\,m}$ — (1)

37 CSA of cone = Area of sector — (1)

$= \dfrac{\theta}{360} \times \pi \times R^2$ — (1)

$= \dfrac{120}{360} \times \dfrac{22}{7} \times 21 \times 21$ — (2)

$= 462\ cm^2$ — (1)

(any method carries mark)

(OR)

$2\pi r = \dfrac{\theta}{360} \times 2\pi R$ — (1)

$r = \dfrac{\theta}{360} \times R$ — (1)

$\Rightarrow r = \dfrac{120}{360} \times 21 \Rightarrow \boxed{r = 7\ cm}$ — (1)

$\therefore CSA = \pi r l \Rightarrow \dfrac{22}{7} \times 7 \times 21$ — (1)

$= 462\ cm^2$ — (1)

38 $2\pi R = 44\,cm \Rightarrow R = 7\,cm$ — (1)

$2\pi r = 8.4\pi \Rightarrow r = 4.2\,cm$ — (1)

$V = \frac{1}{3}\pi h (R^2 + r^2 + Rr)$ — (1)

$= \frac{1}{3} \times \frac{22}{7} \times 14\,(7^2 + 4.2^2 + 7 \times 4.2)$

$= \dfrac{44}{3}(49 + 29.4 + 17.64)$ — (1)

$= 1408.6\ cm^3$ — (1)

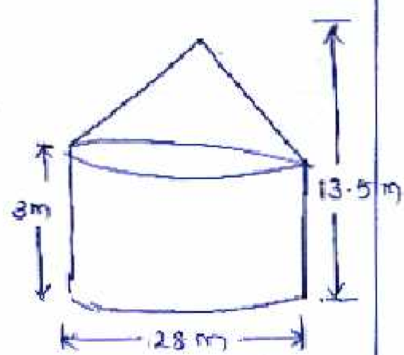
39

cylinder

$h = 3\,m$

$2r = 28$

$r = 14\,m$



cone

$h_1 = 13.5 - 3$

$= 10.5\,m$ — (1)

$r = 14\,m$

$\therefore l = \sqrt{(10.5)^2 + 14^2}$

$= 0.7\sqrt{15^2+20^2} = (0.7 \times 25)$

$= 17.5\text{ m}$ — 1

$TSA = 2\pi r h + \pi r l$

$= \pi r(2h + l)$ — 1

$= \frac{22}{7} \times 14\,(2\times 3 + 17.5)$ — 1

$= 44 \times (6 + 17.5) = 44 \times 23.5$

$= 1034\text{ m}^2$ — 1

40

$SD = \sqrt{\frac{\Sigma x^2}{n} - \left(\frac{\Sigma x}{n}\right)^2}$

$= \sqrt{\frac{n(n+1)(2n+1)}{6n} - \left(\frac{n+1}{2}\right)^2}$ — 1

$= \sqrt{\frac{(n+1)(2n+1)}{6} - \left(\frac{n+1}{2}\right)^2}$

$= \sqrt{\frac{n+1}{2}\left[\frac{2n+1}{3} - \frac{n+1}{2}\right]}$ — 1

$= \sqrt{\frac{n+1}{2}\left[\frac{4n+2-3n-3}{6}\right]}$ — 1

$= \sqrt{\left(\frac{n+1}{2}\right)\left(\frac{n-1}{6}\right)}$ — 1

$= \sqrt{\frac{n^2-1}{12}}$ — 1

41

x	f	$d = x - 13$	d^2	fd	fd^2
3	7	−10	100	−70	700
8	10	−5	25	−50	250
13	15	0	0	0	0
18	10	5	25	50	250
23	8	10	100	80	800
	$\Sigma f = 50$			$\Sigma fd = 10$ — 1	$\Sigma fd^2 = 2000$ — 1

$\sigma = \sqrt{\frac{\Sigma fd^2}{\Sigma f} - \left(\frac{\Sigma fd}{\Sigma f}\right)^2}$

$= \sqrt{\frac{2000}{50} - \left(\frac{10}{50}\right)^2}$ — 1

$= \sqrt{40 - \frac{1}{25}}$ — 1 $= \sqrt{\frac{999}{25}}$

$= \frac{31.61}{5} \simeq 6.32$ — 1

42

$n(S) = 20$ — 1

$P(W) = \frac{10}{20}$ — 1, $P(B) = \frac{5}{20}$ — 1

$P(G) = \frac{3}{20}$ — 1

$P(W \cup B \cup G) = \frac{10}{20} + \frac{5}{20} + \frac{3}{20}$ — 1

$\because$ W, B, G are mutually Exclusive

$= \frac{9}{10}$ — 1

43

(i) $P(A \cup B) = 0.25 + 0.35 - 0.15$ — 1

$= 0.45$ — 1

(ii) $P(A \cap \bar{B}) + P(\bar{A} \cap B)$

$= (0.25 - 0.15) + (0.35 - 0.15)$ — 1

$= 0.10 + 0.20$ — 1

$= 0.30$ — 1

$= 0.3$

44

$n(S) = 36$

A − ÷3   B − ÷4

$A = \{(1,2)(2,1)(1,5)(5,1)(2,4)(4,2)(3,3)(3,6)(6,3)(4,5)(5,4)(6,6)\}$

$n(A) = 12 \Rightarrow P(A) = \frac{12}{36}$ — 1

$B = \{(1,3)(3,1)(2,2)(2,6)(6,2)(3,5)(5,3)(4,4)(6,6)\}$

$n(B) = 9,\ P(B) = \frac{9}{36}$ — 1

$A \cap B = \{(6,6)\} \Rightarrow P(A \cap B) = \frac{1}{36}$ — 1

$P(A \cup B) = \frac{12}{36} + \frac{9}{36} - \frac{1}{36} = \frac{20}{36} = \frac{5}{9}$ — 1

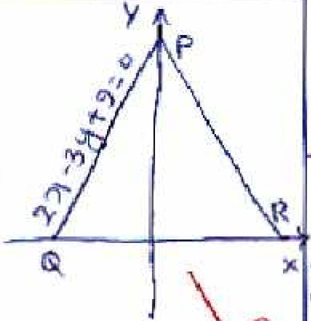
$P(A \cup B)' = 1 - \frac{5}{9} = \frac{4}{9}$ — 1

45 (a)

eq of PQ

$= 2x-3y+9=0$ —(1)

$P(0, y)$ $Q(x, 0)$



(1)

From eq (1)

$2(0)-3y+9=0 \Rightarrow y=3$

$\therefore P(0,3)$ — (1)

From eq (1) $2x-0+9=0$

$\Rightarrow x = -\frac{9}{2}$

$\therefore Q\left(-\frac{9}{2}, 0\right)$ — (1)

$PQ = PR \Rightarrow R\left(\frac{9}{2}, 0\right)$

∴ The Reqd eq PR

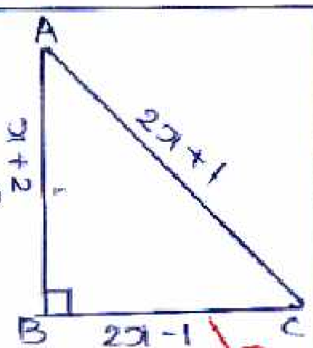
$\frac{y-3}{0-3} = \frac{x-0}{-\frac{9}{2}-0}$ — (1)

$\Rightarrow 9y-27 = -6x$

$\Rightarrow \boxed{2x+3y-9=0}$ — (1)

(b)

As per Pythagoras Theorem



(1)

$(2x+1)^2 = (2x-1)^2+(x+2)^2$ — (1)

$\Rightarrow (2x+1)^2-(2x-1)^2=(x+2)^2$

$\Rightarrow 4(2x)(1) = x^2+4x+4$

$8x = x^2+4x+4$

$\Rightarrow x^2-4x+4=0$ — (1)

$\Rightarrow (x-2)^2=0$ — (1)

$\Rightarrow x-2=0 \Rightarrow \boxed{x=2}$

∴ sides — (1)

3, 4, 5 units

Area $= \frac{1}{2}\times 3\times 4$

$= 6$ units — (1)

SECTION – D

46 (a)

Rough dia — (1)

Base BC = 5.5cm — (1)

$\angle A = 60°$, — (1)

construction of 90° — (1)

perpendicular bisector — (1)

Drawing circle — (1)

compleating △ABC — (2)

median 4.5cm — (1)

steps — (1)

(b)

Rough dia — (1)

AB = 6.5cm — (1)

$\angle ABX = 110°$ — (1)

BC = 5.5cm — (1)

compleating △ABC — (1)

two $\perp^r$ bisectors — (1)

Drawing circle — (1)

line segment CD ∥ AB — (1)

compleations cyclic quadrilateral — (1)

steps — (1)

47 (a)

Scale — (1)

X-Y-axis — (1)

Table — (2)

Type of variation — (1)

ploting points

Joining parabola — (1)

Dotted line — (2)

$x=5$, $y=4$ — (1)

$y=10$ $x=2$ — (1)

b) Scale — 1
x, y - axis — 1
Table - 1
Table - 2
Joining parabola — 1
Joining st. line — 1
plotting solution set $\{-2, 3\}$

Table 1

(−3, 0) (−2, −3) (−1, −4) (0, −3)
(1, 0) (2, 5) (3, 12) — 3

st. line → $y = 3x + 3$ — 1

Table 2 — 1

(−2, −3) (−1, 0) (0, 3) (1, 6) (2, 9)

solution set $\{-2, 3\}$ — 1

Handling Teachers :

1) S. Bd

2)

3) Venkatesh

4) N.L.Kaly 19/11

5) R. Preetha 19/11

Yamuna Gopal 19/11/18