Marking Scheme

PRE BOARD -1

KVS LUCKNOW REGION 2023-24

CLASS-X ***SUBJECT- MATHEMATICS(STANDARD)-041*** ***Max. Marks 80***

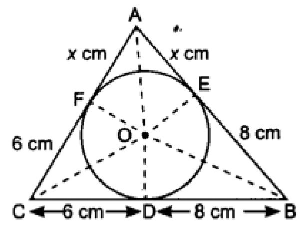
1	OPTION C (20)
2	OPTION B (2)
3	OPTION C (38)
4	OPTION D (5)
5	OPTION B (2)
6	OPTION B (-3/7)
7	OPTION A (9)
8	OPTION A(3)
9	OPTION D (20)
10	OPTION B (12)
11	OPTION A (25)
12	OPTION A (50)
13	OPTION B (1 /√10)
14	OPTION C (128)
15	OPTION D (3:1)
16	OPTION C
17	OPTION D (0.993)
18	OPTION A (1/18)
19	OPTION A
20	OPTION C

SECTION B

Q.21	CORRECT VALUES SUM OF ZEROES AND PRODUCT OF ZEROES K= 7	1 + 1
Q.22	CORRECT RATIO 2 : 9 Y = -4/ 11	1 + 1
Q.23	CORRECT SIMILARITY OF TRIANGLE CORRECT RELATION	1 + 1
Q.24	CORRECT PROOF AND USING CORRECT THEOREM	1 + 1

Q.25	$(\sin\theta + \cos\theta)^2 = \sqrt{2} \times \sqrt{2}$ We get $2\sin\theta.\cos\theta = 1$ Now $\tan\theta + \cot\theta = (\sin^2\theta + \cos^2\theta)/\sin\theta.\cos\theta$ $= 2$ OR $(1 + \cot A - \text{cosec}A)(1 + \tan A + \sec A)$ Using correct identity Correct Proof	1 1

SECTION C

Q.26	Let us assume, to the contrary, that $\sqrt{5}$ is rational. That is, we can find integers a and b (≠ 0) such that $\sqrt{5} = \frac{a}{b}$ · , and assume that a and b are coprime. So, $\sqrt{5}$ b = a Squaring on both sides, and rearranging, we get $5b^2 = a^2$. Therefore, a^2 is divisible by 5, and by Theorem 1.3, it follows that a is also divisible by 5. So, we can write a = 5c for some integer c. we get $5b^2 = 25a^2$, that is, $b^2 = 5a^2$. This means that b^2 is divisible by 5, and so b is also divisible by 5 (using Theorem 1.3 with p = 5). Therefore, a and b have at least 5 as a common factor. But this contradicts the fact that a and b are coprime. This contradiction has arisen because of our incorrect assumption that $\sqrt{5}$ is rational. So, we conclude that $\sqrt{5}$ is irrational.	1 1 1
Q.27.	$X^2 + Y^2 = 157$ Equation 1 4 (X + Y) = 68 X + Y = 17 , put value of y in equation 1 On solving we get $Y^2 - 17Y + 66 = 0$ THEN Y = 11 ,6 SIDES OF SQUARES ARE 11 AND 6cm.	½ ½ 1 1
Q.28		1+1+1 1 1

BD = 8 cm and DC = 6 cm 1

BE = BD = 8 cm

CD = CF = 6 cm

Let AE = AF = x cm

In ΔABC, a = 6 + 8 = 14 cm

b = (x + 6) cm 1

c = (x + 8) cm

$$s = \frac{a+b+c}{2} = \frac{14+x+6+x+8}{2} = \frac{2x+28}{2} = (x+14) \text{ cm}$$

29.

$$\text{ar}(\Delta ABC) = \sqrt{s(s-a)(s-b)(s-c)}$$

$$= \sqrt{(x+14)\times x \times 8 \times 6} = \sqrt{48x \times (x+14)} \text{ cm}^2 \quad ...(i)$$ 1+1

Again, $\text{ar}(\Delta ABC) = \text{ar}(\Delta OBC) + \text{ar}(\Delta OCA) + \text{ar}(\Delta OAB)$

$$= \frac{1}{2}\times 4 \times a + \frac{1}{2}\times 4 \times b + \frac{1}{2}\times 4 \times c$$ 1

$$= 2a + 2b + 2c = 2(a+b+c) = 2 \times 2(x+14) \quad ...(ii)$$

From (*i*) and (*ii*), we get

30

$$\sqrt{48x(x+14)} = 4(x+14) \Rightarrow 48x(x+14) = 4^2(x+14)^2$$

$$\Rightarrow 48x(x+14) = 16(x+14)^2 \Rightarrow 3x(x+14) = (x+14)^2$$

$$\Rightarrow 3x = x + 14 \Rightarrow 2x = 14 \Rightarrow x = 7$$

$$AB = x + 8 = 7 + 8 = 15 \text{ cm}$$ 1

$$AC = x + 6 = 7 + 6 = 13 \text{ cm}$$ 2

30

θ + θ = θ − θ

θ + θ

θ(θ + 1) θ − 1)(θ)

= θ − θ

Length of arc

Area of the segment

or

31.

Solution : Area of the segment AYB

$= \text{Area of sector OAYB} - \text{Area of } \Delta \text{ OAB}$

Now, area of the sector OAYB $= \frac{120}{360} \times \frac{22}{7} \times 21 \times 21 \text{ cm}^2 = 462 \text{ cm}^2$

For finding the area of Δ OAB, draw OM $\perp$ AB as shown in Fig. 11.7.

Note that OA = OB. Therefore, by RHS congruence, Δ AMO $\cong$ Δ BMO.

So, M is the mid-point of AB and $\angle$ AOM = $\angle$ BOM $= \frac{1}{2} \times 120° = 60°$.

Let OM = x cm

So, from Δ OMA, $\frac{OM}{OA} = \cos 60°$

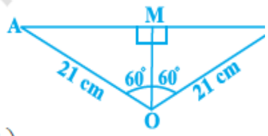


Fig. 11.7

or, $\frac{x}{21} = \frac{1}{2}$ $\left(\cos 60° = \frac{1}{2}\right)$

or, $x = \frac{21}{2}$

So, $OM = \frac{21}{2}$ cm

Also, $\frac{AM}{OA} = \sin 60° = \frac{\sqrt{3}}{2}$

So, $AM = \frac{21\sqrt{3}}{2}$ cm

So, area of Δ OAB $= \frac{1}{2} AB \times OM = \frac{1}{2} \times 21\sqrt{3} \times \frac{21}{2} \text{ cm}^2$

$= \frac{441}{4}\sqrt{3} \text{ cm}^2$ (3)

Therefore, area of the segment AYB $= \left(462 - \frac{441}{4}\sqrt{3}\right) \text{cm}^2$ [From (1), (2) and (3)]

$= \frac{21}{4}(88 - 21\sqrt{3}) \text{cm}^2$

Since pack of playing have 52 cards, therefore n(S)=52

i) Let A: getting king of black colour

n(A)=2

$P(A)=\frac{n(A)}{n(S)} = \frac{2}{52} = \frac{1}{26}$

ii) Let B: getting red colour or jack

n(B)=28

$P(B)=\frac{n(B)}{n(S)} = \frac{28}{52} = \frac{7}{13}$

iii) Let C: getting not a face card

n(C)=40

$P(C)=\frac{n(C)}{n(S)} = \frac{40}{52} = \frac{10}{13}$

OR

Total outcomes = 36

(i)1/4

(ii) 1/6

(iii)7/18

SECTION D

Q.32	Let the speed of train be xkm/h and scheduled time of journey be y hours. Distance = Speed x Time = xy km Case 1 : 2x – 3y = -12	1

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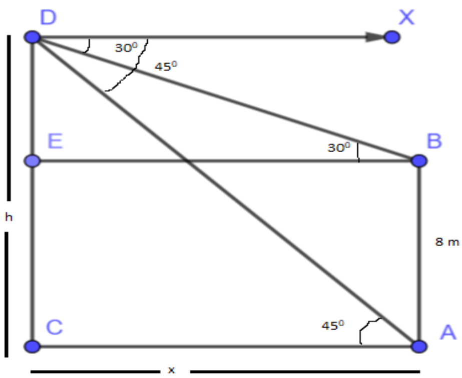
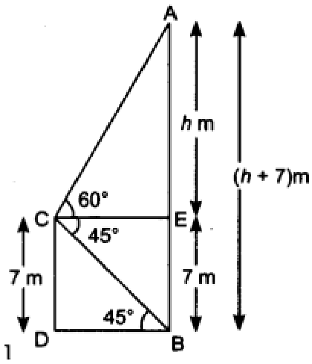
	Case 2 : x – y = 6 By solving case 1 and case 2 We get x = 30km /h , y = 24 hours Total distance = 30 x 24 = 720 km **OR** For correct line graph for $2x + y = 6$ For correct line graph for $2x – y +2 = 0$ Correct value for x = 1 , y = 4 Area of triangle =8 sq.cm	1 2 1 1.5 1.5 1
Q.33 34.	For correct figure Slant height l = 12.2 cm Volume of toy = volume of cone + volume pf hemisphere= 1232cm^3 Area of coloured sheet = csa of cone + csa of hemisphere = 576.4 cm^2 For correct figure  In ΔACD, tan 45^0=$\frac{CD}{AC}$ 1=$\frac{h}{x}$ $\Rightarrow x = h$ ....(1) Again in ΔBED, tan 30^0=$\frac{ED}{EB}$ $\Rightarrow \frac{1}{\sqrt{3}} = \frac{h-8}{x}$ $\Rightarrow x = h\sqrt{3} - 8\sqrt{3}$ $\Rightarrow h - h\sqrt{3} = - 8\sqrt{3}$ $\Rightarrow h = \frac{8\sqrt{3}}{\sqrt{3}-1}$ $\Rightarrow h = 12 + 4\sqrt{3} = 18.93$ m (using $\sqrt{3} = 1.732$) Hence x=h=$12 + 4\sqrt{3} = 18.93$ m OR	1/2 1 2 1.5 1 1 1 1 1 1 1 1 1 1

35.	**Given:** CD = 7 m (height of the building),  $\angle ACE = 60°$, and $\angle ECB = 45°$ $\Rightarrow \quad \angle CBD = 45°$ In ΔCDB, $\frac{CD}{DB} = \tan 45° \Rightarrow \frac{7}{DB} = 1$ $\Rightarrow \quad DB = 7$ m In ΔAEC, $\frac{AE}{CE} = \tan 60°$ $\Rightarrow \quad \frac{h}{7} = \sqrt{3} \quad [\because DB = CE = 7m]$ $\Rightarrow \quad h = 7\sqrt{3}$ m Now, $AB = h + 7 = 7\sqrt{3} + 7 = 7(\sqrt{3} + 1)$m	1 + 1 1 1 1

Solution :

Class intervals	Frequency	Cumulative frequency
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	$76+x+y$

It is given that $n = 100$

So, $76+x+y=100$, i.e., $x+y=24$ (1)

The median is 525, which lies in the class 500 – 600

So, $l=500$, $f=20$, $\text{cf}=36+x$, $h=100$

Using the formula : $\text{Median} = l + \left(\dfrac{\frac{n}{2} - \text{cf}}{f}\right)h$, we get

$$525 = 500 + \left(\frac{50-36-x}{20}\right)\times 100$$

i.e., $525-500=(14-x)\times 5$

i.e., $25 = 70 - 5x$

i.e., $5x = 70-25=45$

So, $x = 9$

Therefore, from (1), we get $9+y=24$

i.e., $y = 15$

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36. (i)	A + 3d = 1800 , a + 7d = 2600 D = 200 and a = 1200 (ii) a_{12} = a +11d = 3400 (iii)S_{10} = 21000 OR S_n = 31200 , a = 1200 , d= 200 , n= ? On putting value S = n/2{ 2a + (n-1)d} N= 13	
37.	(i) Position of red flag= (2 , ¼ x100)= (2,25) (ii) Distance between two flags =√36 +25 = √61 (iii) Position of the blue flag = (5 , 22.5) OR Ratio between Green and Red Flag is 1 :3 Required pont = (7/2 , 95/4)	
38.	(i) Distance from the base of lamp(BD)= 1.2m x4s= 4.8metre (ii)∆ABE similar ∆CDE BE/DE = AB/CD= 4.8 +X /X = 3.6/0.9 THEN X = 1.6m Or AE/CE = BE/DE (4.8 + 1.6)/ 1.6 = 4 AE = 4CE AC + CE = 4CE AC/CE = 3/1	