Kendriya Vidyalaya Sangathan Bhopal Region SET - III

First Pre- Board Session 2020-21

Class X

Mathematics- Standard (041)

Marking - Scheme

	Part - A	
1	3600 Or $5 \times 11^2 \times 23$	1
2	p ≠ 4	1
3	no real	1
4	14 ,38 or 20	1
5	625:81	1
6	350 cm^2	1
7	$\sqrt{2} - 1$	1
8	mean	1
9	k = 10	1
10	$\frac{3}{26}$	1
11	k = 1 or k= 4	
12	Step ½ mark Correct answer : 23 ½ mark OR Step ½ mark Correct answer : -3 ½ mark	1
13	Use of Area of circle ½ mark Correct answer: D=52 cm ½ mark	1
14	Using Area of Quadrant = $\frac{1}{4}\ \pi r^2$, $r = 7cm$, 2r = 14 cm	1
15	Total surface area of the solid= $2\pi rh + \pi r^2 + \pi rl$	1
16	$\beta - \alpha = 30^0$ or 30^0	1
	SECTION-II	
Q17	(a) (III) $\sqrt{10}$	
	(b) (I)8	

	(c) (IV)$\sqrt{20}$	
	(d) (IV) (2.0 ,8.5)	
	(e) (I) (13,8)	
Q18	(a) (III) 90^0	1X4=4
	(b) (II) SAS	
	(c)(II) 4:9	
	(d) (IV) Converse of Pythagoras theorem	
	(e) (III)24	
Q19	(a)(II) (4, 1)	1X4=4
	(b)(I)intersects x-axis	
	(c)parabola	
	(d) (II) $x^2 - 3x-2$	
	(e) (I) -1,-1	
Q20	(a)(IV) 6.2hectares	1X4=4
	(b) (II)7	
	(c) (III) median	
	(d) (II) 5-7	
	(e) (I) 10	
21	LCM × HCF = Product of two numbers LCM = = 22338	1 1
22	$\alpha+\beta=5$ and $\alpha\beta=k$ $\alpha-\beta=1$ $(\alpha-\beta)^2=1^2$ $(\alpha+\beta)^2-4\alpha\beta=1$ 25-4k=1 K=6	1 1

23	P (x, y) is equidistant from the point A(3, 6) and B(– 3, 4) PA = PB Getting relation 3x + y – 5 = 0	1 1
24	Correct prove	2
25	Correct construction and justification	2
26	a=20 d=-3/4 then $a_n < 0$ a+(n-1)d<0 20+(n-1)(-3/4)<0 83-3n<0 3n>83 => n=28 0r S_m=m/2{(a+(m-1)d} S_n= n/2{(a+(n-1)d} S_{m+n}= 0 (since S_m= S_n => a =-(m+n)	1 1 1 1
27	For correct proof	3
28	Pipe A take x hours and Pipe B takes y hours to fill the pool separately. 1/x + 1/ y = 1/12——(1) Now Let 1/x = P & 1/y = Q then P + Q = 1/12 ⇒12P+12Q=1——(3) And 4P + 9Q = 1/2 ⇒8P + 18Q = 1———(4) Now solving equation 3 & 4 ⇒ −30Q = −1 ⇒ Q = 1/30 now put value of Q in equation 3 We get P=1/20 So x=20 and y=30	1 1 1

29	x=-5 so put in q.e. $2x^2+px-15=0$ p=7 put p in q.e. $p(x^2+x)+k=0$ $7x^2+7x+k=0$ on solving k=7/4	1 1 1
30	Let TR = y Since OT is perpendicular bisector of PQ. Therefore, PR=QR=4cm In right triangle OTP and PTR, we have, $TP^2=TR^2+PR^2$ Also, $OT^2=TP^2+OP^2$ $OT^2=(TR^2+PR^2)+OP^2$ $(y+3)^2=y^2+16+25$ (OR = 3, as $OR^2 = OP^2 - PR^2$) $\Rightarrow 6y=32$ $\Rightarrow y=\frac{16}{3}$ $\Rightarrow TP^2=TR^2+PR^2$ $\Rightarrow TP^2=\left(\frac{16}{3}\right)^2+4^2=\frac{256}{9}+16=\frac{400}{9}$ $\Rightarrow TP=\frac{20}{3}$ cm	1 1 1
31	For correct diagram For writing Given & To Prove For correct proof	½ ½ 2
32	Given: diameter of the well = 3 m $\Rightarrow$ Radius $=\frac{3}{2}$ m Depth of the well = 14 m Volume of the earth taken out from the well = $\pi r^2 h$ $=\pi\left(\frac{3}{2}\right)^2\times 14=\frac{\pi\times 9\times 14}{4}=\frac{63}{2}\pi\ m^3$	1 1

∵ Earth taken out from the well evenly spread to form an embankment having height h and width of embankment around the well is 4 m. 1

∴ External radius (R) = radius of well + width of the embankment

$$= \frac{3}{2}\text{ m} + 4\text{ m} = \frac{11}{2}\text{ m}$$

Internal radius $= \frac{3}{2}$ m = radius of well

Volume of the earth used for embankment $= \pi(R^2 - r^2)h$

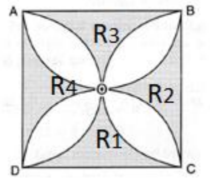
$$= \pi\left[\left(\frac{11}{2}\right)^2 - \left(\frac{3}{2}\right)^2\right]h\text{ m}^3 = \pi\left(\frac{121}{4} - \frac{9}{4}\right)h\text{ m}^3$$

$$= \pi\left(\frac{112}{4}\right)h\text{ m}^3 = \pi(28)h\text{ m}^3$$

According to question,

$$\frac{63}{2}\pi = \pi \times 28h \Rightarrow h = \frac{63}{2 \times 28} = \frac{9}{8} = 1.125\text{ m}$$

33



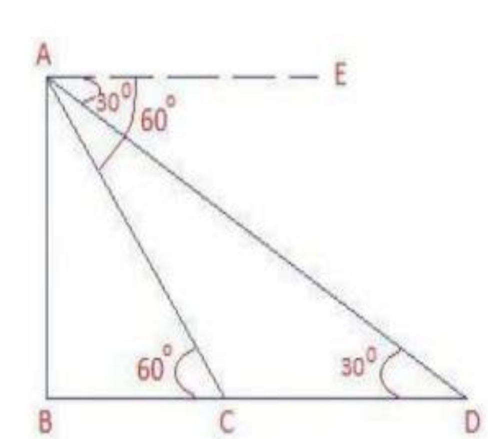
Area of shaded region =area of square ABCD –(area of R1+area of R2+area of R3+area of R4) 1 ½

57cm^2 1 ½

Area of unshaded region =(area of R1+area of R2+area of R3+area of R4)

43cm^2

34 For correct figure 1



Let AB be the tower.

D is the initial and C is the final position of the car respectively.

Since man is standing at the top of the tower so, Angles of depression are measured from A. 1

BC is the distance from the foot of the tower to the car.

In right ΔABC,

tan 60° = AB/BC

√3 = AB/BC

BC = AB/√3 1

AB = √3 BC

Step 2:

In right ΔABD,

tan 30° = AB/BD

1/√3 = AB/BD 1

AB = BD/√3

Step 3: Form step 1 and Step 2, we have

√3 BC = BD/√3 (Since LHS are same, so RHS are also same)

3 BC = BD 1

3 BC = BC + CD

2BC = CD

or BC = CD/2

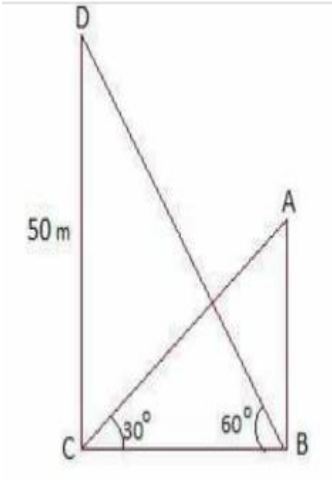
Here, distance of BC is half of CD. Thus, the time taken is also half.

Time taken by car to travel distance CD = 6 sec. Time taken by car to travel BC = 6/2 = 3 sec. 1

OR

For correct figure

Let CD be the height of the tower. AB be the height of the building. BC be the distance between the foot of the building and the tower. Elevation is 30 degree and 60 degree from the tower and the building respectively. 1



1

In right ΔBCD,

tan 60° = CD/BC

√3 = 50/BC 1

BC = 50/√3 ...(1)

Again, 1

In right ΔABC,

tan 30° = AB/BC

⇒ 1/√3 = AB/BC 1

Use result obtained in equation (1)

AB = 50/3 Thus, the height of the building is 50/3

35

Consider the left hand side of the expression: $\dfrac{\tan A}{1-\cot A}+\dfrac{\cot A}{1-\tan A}$

$$=\frac{\frac{\sin A}{\cos A}}{1-\frac{\cos A}{\sin A}}+\frac{\frac{\cos A}{\sin A}}{1-\frac{\sin A}{\cos A}}$$ 1

$$=\frac{\frac{\sin A}{\cos A}}{\frac{\sin A-\cos A}{\sin A}}+\frac{\frac{\cos A}{\sin A}}{\frac{\cos A-\sin A}{\cos A}}$$ 1

$$=\frac{\sin^2 A}{\cos A(\sin A-\cos A)}+\frac{\cos^2 A}{\sin A(\cos A-\sin A)}$$ 1

$$=\frac{\sin^2 A}{\cos A(\sin A-\cos A)}-\frac{\cos^2 A}{\sin A(\sin A-\cos A)}$$

$$=\frac{\sin^3 A}{\cos A\sin A(\sin A-\cos A)}-\frac{\cos^3 A}{\sin A\cos A(\sin A-\cos A)}$$ 1

$$=\frac{\sin^3 A-\cos^3 A}{\cos A\sin A(\sin A-\cos A)}$$

$$=\frac{(\sin A-\cos A)(\sin^2 A+\sin A\cos A+\cos^2 A)}{\cos A\sin A(\sin A-\cos A)}$$ 1

$$=\frac{(\sin^2 A+\sin A\cos A+\cos^2 A)}{\cos A\sin A}$$

$$=\frac{(1+\sin A\cos A)}{\cos A\sin A}$$

$$=\sec A\,\mathrm{cosec}A+1$$

36

Here, it is given that Median =28.5 and n=$\sum f_i$=60

Cummulative frequency table for the following data is given.

Here n=60⇒2n=30 1

Since, median is 28.5, median class is 20−30 1

Hence, l=20,h=10,f=20,c.f.=5+x

Therefore, Median =l+(f2n−cf)h

28.5=20+(2030−5−x)10

⇒28.5=20+225−x

⇒8.5×2=25−x 1

⇒x=8

Also, 45+x+y=60

⇒y=60−45−x=15−8=7. 1

Hence, x=8,y=7

Class - interval	Frequency	Cumulative frequency
0 – 10	5	5
10 – 20	x	$5 + x$
20 – 30	20	$25 + x$
30 – 40	15	$40 + x$
40 – 50	y	$40 + x + y$
50 – 60	5	$45 + x + y$
Total	n = 60	

1