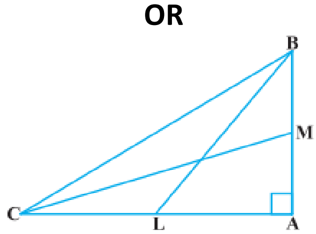
SAMPLE PAPER - MARKING SCHEME
MATHEMATICS (STANDARD) 2020-21
CLASS X

Q. No	ANSWER	MARKS
	Part-A	
1	8 OR 13	1 1
2	$x^2 - 2\sqrt{3}x + 1$	1
3	d = -1 OR 196	1
4	(0,0)	1
5	3/k = -4/3 K=-9/4	½ ½
6	$k = \pm 4\sqrt{6}$	1
7	3 OR 0	1
8	27cm	½ + ½
9	100^0 OR 6r	1
10	$2\sqrt{(a^2 - b^2)}$	1
11	5	1
12	$\sqrt{2} - 1$	1
13	30˚	1
14	10	1
15	a/r =Cube root of (8/3)	½ ½
16	3/4 OR	1

	3/26	
	Section II	
17	**(a) (iv)** **(b) (ii)** **(c) (i)** **(d) (ii)** **(e) (iii)**	**1 x 4=4**
18	**(a) (iv)** **(b) (iii)** **(c) (ii)** **(d) (ii)** **(e) (iv)**	**1 x 4=4**
19	**(a) (i)** **(b) (ii)** **(c) (iii)** **(d) (ii)** **(e) (ii)**	**1 x 4=4**
20	**(a) (iii)** **(b) (i)** **(c) (ii)** **(d) (iv)** **(e) (iii)**	**1 x 4=4**
	Section III	
21	**338x HCF = 26 x 169** **HCF = 13**	**1** **1**
22	**$\{(11/3)^2 - 2 \times (-4/3)\} / -4/3$** **-145/12**	**1** **1**
23	**Mid point = [(3 + k)/2 , 5]** **Substituting in x +y – 10 = 0, k= 7** **OR** **AP = BP, $AP^2 = BP^2$** **$(x+5)^2 + (y-3)^2 = (x-7)^2 + (y-2)^2$** **24x – 2y =19**	**1** **1** **½** **1** **½**
24	 **Since PA ⊥ OA, < OAP = 90^0** **<OAP = <OAP - <BAP = 90^0- 50^0** **= 40^0** **<OAB = <OBA =40^0(OA = OB)**	 **1** **1**

	$<AOB + <OAB + <OBA = 180^0$ $<AOB = 100^0$	
25	**Construction of line segment** **Division of line segment in the given ratio**	**½** **1½**
26	$\sin\theta = 1 - \sin^2\theta = \cos^2\theta$ **Squaring both sides** $\sin^2\theta = \cos^4\theta$ $1 - \cos^2\theta = \cos^4\theta$ $\cos^2\theta + \cos^4\theta = 1$ **OR** $x^2 + y^2 + z^2$ $= r^2 \sin^2\theta \cos^2\alpha + r^2 \sin^2\theta \sin^2\alpha + r^2 \cos^2\theta$ $= r^2 \sin^2\theta (\cos^2\alpha + \sin^2\alpha) + r^2 \cos^2\theta$ $= r^2 \sin^2\theta + r^2 \cos^2\theta$ $= r^2(\sin^2\theta + \cos^2\theta)$ $= r^2$	 **1** **½** **½** **1** **½** **½**
	Section IV	
27	**Proving √2 is irrational** **Let 5 + 2√2 = p/q** **2√2 = p/q - 5** **√2 = (p- 5q)/2q** **Not possible as √2 is irrational. Hence 5 + 2√2 is irrational.**	$1\frac{1}{2}$ $1\frac{1}{2}$
28	$3x^2+px+4=0$ $3(2/3)2+p(2/3)+4=0$ $4/3+2p/3+4=0$ $P=-8$ $3x^2-8x+4=0$ $3x^2-6x-2x+4=0$ $X=2/3$ or $x=2$ Hence, $x=2$ **OR**	**1½** $1\frac{1}{2}$ **½** **½** **½** **½** **½**

	$\alpha+\beta=5$ ----(1) $\alpha-\beta=1$ ----(2) Solving (1) and (2), we get $\alpha=3$ and $\beta=2$ also $\alpha\beta=6$ or $3(k-1)=6$ $k-1=2$ $k=3$	½
29	**In the figure, $\Delta ABC \sim \Delta XBY$ (AA)** **Ar $\Delta ABC/\Delta XBY$ = $(AB/XB)^2$ ……(1)** **Ar ABC /ar ΔXBY = 2/1 …….(2)** **From (1) and (2) $(AB/XB)^2 = 2/1$, so $AB/XB = \sqrt{2}/1$** **$XB/AB = 1/\sqrt{2}$** **$1 - XB/AB = 1 - 1/\sqrt{2}$** **Hence $AX/AB = (2-\sqrt{2})/2$** **OR**  **$BC^2 = AB^2+AC^2$** **$BL^2 = AL^2+AB^2 = (AC/2)^2+AB^2$** **$= AC^2/4 + AB^2$** **$4BL^2 = AC^2 + 4AB^2$ ……..(1)** **Also $CM^2 = AC^2 + AM^2$** **$4CM^2 = 4AC^2 + AB^2$ ……….(2)** **Adding (1) & (2)** **$4(BL^2 + CM^2) = 5BC^2$**	**1** **1** **1** **1** **1** **1**
30		

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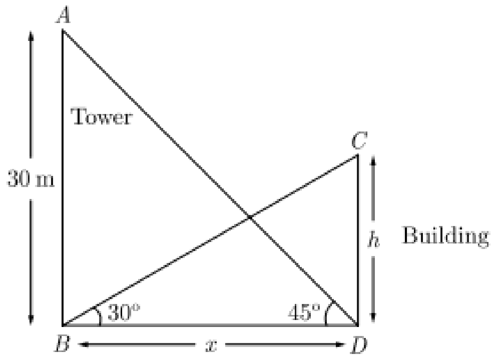

Tan 30^0 = h/x
1/√3 = h/x ....(1)
Tan 45^0= 30 /x
1= 30 /x
x = 30m ......(2)

From (1) and (2)
h = 10√3 m
height of the building=10√3=10x1.73=17.3m
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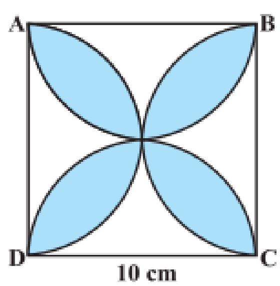

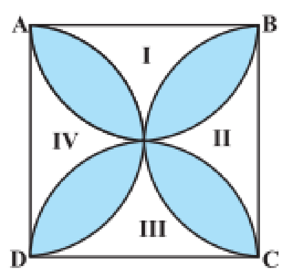

Let us mark the four unshaded regions as I, II, III and IV (see Fig. 12.18).
Area of I + Area of III
= Area of ABCD – Areas of two semicircles of each of radius 5 cm
$= \left(10\times10 - 2\times\frac{1}{2}\times\pi\times5^2\right)\text{cm}^2 = (100 - 3.14\times25)\ \text{cm}^2$
$= (100 - 78.5)\ \text{cm}^2 = 21.5\ \text{cm}^2$
Similarly, Area of II + Area of IV = 21.5 cm^2
So, area of the shaded design = Area of ABCD – Area of (I + II + III + IV)
$= (100 - 2\times21.5)\ \text{cm}^2 = (100 - 43)\ \text{cm}^2 = 57\ \text{cm}^2$
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32

Weight of new born(kg)	1.5-1.75	1.75-2	2 – 2.25	2.25 –2.5	2.5 – 2.75	2.75 –3.0
No. of babies	1	7	10	12	6	4
C.F	1	8	18	30	36	40

1

$n = 40$

$\frac{n}{2} = 20$

This observation lies in the class 2.25–2.5. Therefore, 2.25–2.5 is the median class.

So, $l = 2.25$

$h = 0.25$

$f = 12$

$cf = 18$

$\therefore \quad \text{Median} = l + \frac{\frac{n}{2} - f}{cf} \times h$ **1**

$= 2.25 + \frac{20 - 12}{18} \times 0.25$ **½**

$= 2.25 + \frac{2}{18}$ **½**

= 2.25 +1/9

= 2.36

33

Let x be the blue balls

Total balls = 5 +x **1**

P (red balls) = 5/5+x **1**

P(blue balls) = x /5+x **1**

x /5+x = 3 x (5/5+x)

x = 15

Section V

34

Let speed of the boat in still water =x km/hr, and

Speed of the current =y km/hr

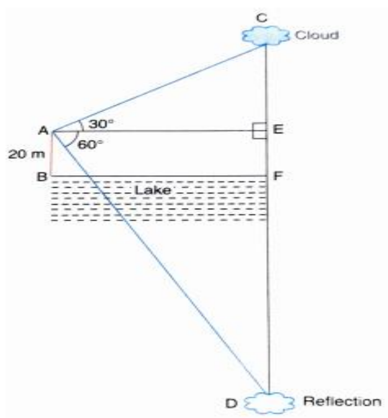
Downstream speed =(x+y) km/hr

Upstream speed =(x−y) km/hr

$\frac{24}{x+y} + \frac{16}{x-y} = 6$--------(1)

$\frac{36}{x+y} + \frac{12}{x-y} = 6$----------(2) **2**

Let $\frac{1}{x+y}$ = u and $\frac{1}{x-y}$ = v

	Put in the above equation we get, 24u+16v=6 Or, 12u+8v=3 ... (3) 36u+12v=6 Or, 6u+2v=1 ... (4) Multiplying (4) by 4, we get, 24u+8v=4v ... (5) Subtracting (3) by (5), we get, 12u=1 $\Rightarrow$u=1/12 Putting the value of u in (4), we get, v=1/4 $\Rightarrow \frac{1}{x+y} = \frac{1}{12}$ and $\frac{1}{x-y} = \frac{1}{4}$ $\Rightarrow$x+y=12 and x−y=4 Thus, speed of the boat in still water = 8 km/hr, Speed of the current = 4 km/hr	2 1
35	 By Laws of Reflection, $CF = FD$ Let $CE = h$ m In right triangle CEA, $\tan 30° = \frac{CE}{AE}$ $\frac{1}{\sqrt{3}} = \frac{h}{AE}$ $AE = h\sqrt{3}$ m In right triangled AED, $\tan 60° = \frac{ED}{AE}$ $\sqrt{3} = \frac{EF + FD}{h\sqrt{3}} = \frac{20 + FD}{h\sqrt{3}}$	½ 1 1 1

	$= \frac{20 + CF}{h\sqrt{3}} = \frac{20 + CE + EF}{h\sqrt{3}}$ $= \frac{20 + h + 20}{h\sqrt{3}}$ $3h = h + 40$ $2h = 40$ $h = 20$ $CE = 20$ m **So height of the cloud is 20+20= 40 m above the lake.**	**1** **½**
36	**Radius of the milk tanker = 1m** **Length = 4.2 cm** **Volume = πx 1 x 4.2 = 13.2m^3** **Ratio of the milk to be supplied = 3:2** **For booth I:** **Volume = (3/5) x 13.2 = 7.92 m^3** **For booth II:** **Volume = (2/5) x 13.2 = 5.28 m^3** **Height in 1st vessel = 7.92/3.96= 2m** **Height in 1st vessel = 5.28/π x 1 = 1.68m** **OR** $l^2 = h^2 + r^2 = 4^2 + 3^2 = 5^2$ $l = 5$ cm Curved surface area of solid cylinder $= 2\pi rh = 2\pi\left(\frac{7}{2}\right)(15)$ $= 105\pi \text{ cm}^2 \quad \ldots(1)$ Area of the base of solid cylinder $= \pi r^2 = \pi\left(\frac{7}{2}\right)^2 \text{ cm}^2 \quad \ldots(2)$	**1** **1** **1** **1** **1** **½** **1** **1** **1**

	Area of the base of conical hole $= \pi R^2 = \pi(3)^2 \text{ cm}^2 \quad \ldots(3)$ Curved surface area of one conical hole $= \pi R l = \pi(3)(5)$ $= 15\pi \text{ cm}^2 \quad \ldots(4)$ Surface area of the remaining solid = Curved surface area of solid cylinder + 2 Curved surface area of one conical hole + 2(surface area of the base) $= (1) + 2(4) + 2\{(2) - (3)\}$	1
	$= 105\pi + 2(15\pi) + 2\left\{\pi\left(\frac{7}{2}\right)^2 - \pi(3)^2\right\}$ $= 105\pi + 30\pi + 2\pi\left(\frac{49}{4} - 9\right)$ $= 135\pi + \frac{13}{2}\pi$ $= 135\pi + 6.5\pi = 141.5\pi$ $= 141.5 \times 3.14 = 444.31 \text{ cm}^2$	½