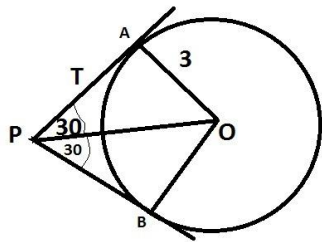
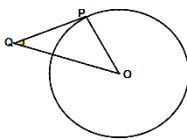


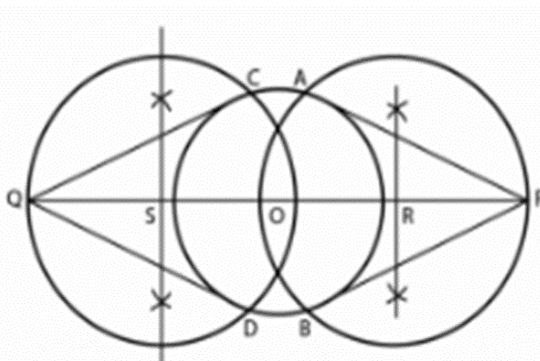
MARKING SCHEME SQP
MATHEMATICS (STANDARD)
2020-21
CLASS X

S.NO.	ANSWER	MARKS
	Part-A	
1.	$(LCM)(3) = 180$ $LCM = 60$ OR Four decimal places	$\frac{1}{2}$ $\frac{1}{2}$ 1
2.	$\alpha + \beta = k/3$ $3 = k/3$ $K = 9$	$\frac{1}{2}$ $\frac{1}{2}$
3.	$\frac{3}{6} = \frac{1}{k} \neq \frac{3}{8}$ $\frac{3}{6} = \frac{1}{k}$ $K = 2$	$\frac{1}{2}$ $\frac{1}{2}$
4.	Let the cost of 1 chair = Rs. x And the cost of 1 table = Rs. y $3x + y = 1500$ $6x + y = 2400$	$\frac{1}{2}$ $\frac{1}{2}$
5.	$a_n = a + (n-1)d$ $0 = 27 + (n-1)(-3)$ $30 = 3n$ $n = 10$ 10^{th} OR $a_n = a + (n-1)d$ $4 = a + 6(-4)$ $a = -28$	$\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$
6.	$9x^2 + 6kx + 4 = 0$ $(6k)^2 - 4 \times 9 \times 4 = 0$ $36k^2 = 144$ $K^2 = 4$ $K = \pm 2$	$\frac{1}{2}$ $\frac{1}{2}$

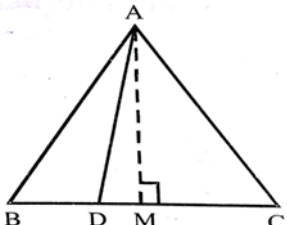
7.	$x^2+7x+10=0$ $x^2+5x+2x+10=0$ $(x+5)(x+2)=0$ $X=-5, x= -2$ OR $3ax^2-6x+1=0$ $(-6)^2-4(3a)(1)<0$ $12a>36 \Rightarrow a>3$	$\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$
8.	$PQ=PT$ $PL+LQ=PM+MT$ $PL+LN=PM+MN$ $\text{Perimeter}(\triangle PLM)$ $=PL+LM+PM$ $=PL+LN+MN+PM$ $=2(PL+LN)$ $=2(PL+LQ)$ $=2 \times 28 = 56\text{cm}$	$\frac{1}{2}$ $\frac{1}{2}$
9.	 In $\triangle PAO$ $\tan 30^\circ = AO/PA$ $1/\sqrt{3} = 3/PA$ $PA = 3\sqrt{3} \text{ cm}$ OR  In $\triangle OPQ$ $\angle P + \angle Q + \angle O = 180^\circ$ $2\angle Q + \angle P = 180^\circ$ $2\angle Q + 90^\circ = 180^\circ$ $2\angle Q = 90^\circ$ $\angle Q = 45^\circ$	$\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$

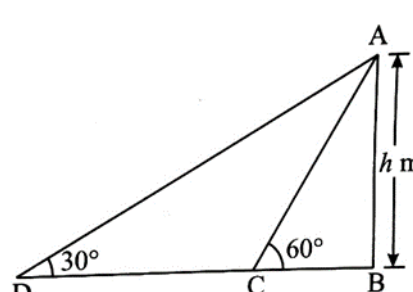
10.	$\frac{AD}{BD} = \frac{AE}{CE}$ $\frac{3}{4.5} = \frac{2}{CE}$ $CE = 3\text{cm}$	$\frac{1}{2}$ $\frac{1}{2}$
11.	8:5	1
12.	$\sin 30^\circ + \cos B = 1$ $\frac{1}{2} + \cos B = 1$ $\cos B = \frac{1}{2}$ $B = 60^\circ$	$\frac{1}{2}$ $\frac{1}{2}$
13.	$x + y$ $= 2\sin^2\theta + 2\cos^2\theta + 1$ $= 2(\sin^2\theta + \cos^2\theta) + 1$ $= 3$	$\frac{1}{2}$ $\frac{1}{2}$
14.	$\text{length of arc} = \frac{\theta}{360^\circ} (2\pi r)$ $= \frac{60}{360} (2 \times \frac{22}{7} \times 21)$ $= 22 \text{ cm}$	$\frac{1}{2}$ $\frac{1}{2}$
15.	$\pi R^2 H = 12 \times \frac{4}{3} \pi r^3$ $1 \times 1 \times 16 = \frac{4}{3} \times r^3 \times 12$ $r^3 = 1$ $r = 1$ $d = 2\text{cm}$	$\frac{1}{2}$ $\frac{1}{2}$
16.	probability of getting a doublet = $\frac{1}{6}$ OR probability of getting a black queen = $\frac{2}{52} = \frac{1}{26}$	1
17.	(a) iii) $(\frac{15}{2}, \frac{33}{2})$ (b) i) 4 (c) iii) 16 (d) iv) (2.0, 8.5) (e) ii) $x - 13 = 0$	1x4=4
18.	(a) iii) 15 cm (b) iv) They are not the mirror image of one another (c) ii) Their altitudes have a ratio a:b (d) iv) 5m (e) iii) 6m	1x4=4
19.	(a) ii) (4, -2) (b) i) Intersects x-axis (c) iii) parabola	1x4=4

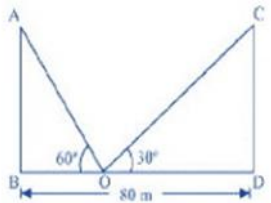
	(d) ii) $x^2 - 36$	
	(e) iii) 0	
20.	(a) iii) 43	1x4=4
	(b) iii) 60	
	(c) ii) Median	
	(d) iii) 80	
	(e) iii) 31	

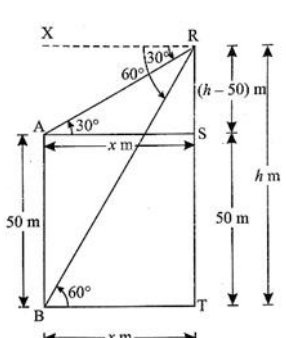
	Part-B	
21.	$4=2 \times 2$ $7=7 \times 1$ $14=2 \times 7$ $\text{LCM}=2 \times 2 \times 7=28$ The three bells will ring together again at 6:28 am	$\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$
22.	Let P(x,0) be a point on X-axis $PA=PB$ $PA^2=PB^2$ $(x-2)^2+(0+2)^2=(x+4)^2+(0-2)^2$ $x^2+4-4x+4=x^2+16+8x+4$ $-4x+4=8x+16$ $x=-1$ $P(-1,0)$ OR $PR:QR=2:1$ $R\left(\frac{1(-2)+2(3)}{2+1}, \frac{1(5)+2(2)}{2+1}\right)$ $R(4/3, 3)$	$\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ 1 $\frac{1}{2}$
23.	Sum of zeroes = $5-3\sqrt{2}+5+3\sqrt{2}=10$ Product of zeroes = $(5-3\sqrt{2})(5+3\sqrt{2})=7$ $P(x)=x^2-10x+7$	$\frac{1}{2}$ 1 $\frac{1}{2}$
24.		Line seg = $1/2$ Circles = $1/2$ Tangents = $1/2 + \frac{1}{2}$

25.	$\tan A = 3/4 = 3k/4k$ $\sin A = 3k/5k = 3/5, \cos A = 4k/5k = 4/5$ $1/\sin A + 1/\cos A$ $= 5/3 + 5/4$ $= (20+15)/12$ $= 35/12$ OR $\sqrt{3} \sin \theta = \cos \theta$ $\sin \theta / \cos \theta = 1/\sqrt{3}$ $\tan \theta = 1/\sqrt{3}$ $\theta = 30^\circ$	$\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$
26.	$\angle A = \angle OPA = \angle OSA = 90^\circ$ Hence, $\angle SOP = 90^\circ$ Also, $AP = AS$ Hence, $OSAP$ is a square $AP = AS = 10\text{cm}$ $CR = CQ = 27\text{cm}$ $BQ = BC - CQ = 38 - 27 = 11\text{cm}$ $BP = BQ = 11\text{cm}$ $X = AB = AP + BP = 10 + 11 = 21\text{cm}$	$\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$
27.	Let $2 - \sqrt{3}$ be a rational number We can find co-prime a and b ($b \neq 0$) such that $2 - \sqrt{3} = a/b$ $2 - a/b = \sqrt{3}$ So we get, $(2a - b)/b = \sqrt{3}$ Since a and b are integers, we get $(2a - b)/b$ is irrational and so $\sqrt{3}$ is rational. But $\sqrt{3}$ is an irrational number Which contradicts our statement Therefore $2 - \sqrt{3}$ is irrational	$\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$
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, $x = 2$	$\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$

	OR $\alpha + \beta = 5$ ----(1) $\alpha - \beta = 1$ ----(2) Solving (1) and (2), we get $\alpha = 3$ and $\beta = 2$ also $\alpha\beta = 6$ or $3(k-1) = 6$ $k-1 = 2$ $k = 3$	$\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$
29.	Area of 1 segment = area of sector – area of triangle $= (90^\circ/360^\circ)\pi r^2 - \frac{1}{2} \times 7 \times 7$ $= \frac{1}{4} \times 22/7 \times 7^2 - \frac{1}{2} \times 7 \times 7$ $= 14\text{cm}^2$ Area of 8 segments = $8 \times 14 = 112\text{ cm}^2$ Area of the shaded region = $14 \times 14 - 112$ $= 196 - 112 = 84\text{cm}^2$ <i>(each petal is divided into 2 segments)</i>	$\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$
30.	$\triangle ABC \sim \triangle DEF$ $\frac{\text{Perimeter}(\triangle ABC)}{\text{Perimeter}(\triangle DEF)} = \frac{AB+BC+CA}{DE+EF+FD} = \frac{AB}{DE}$ $\frac{25}{15} = \frac{9}{X}$ $X = 5.4\text{cm}$ $DE = 5.4\text{cm}$ OR  Construction-Draw $AM \perp BC$ $BD = \frac{1}{3} BC$, $BM = \frac{1}{2} BC$ In $\triangle ABM$, $AB^2 = AM^2 + BM^2$ $= AM^2 + (BD + DM)^2$ $= AM^2 + DM^2 + BD^2 + 2BD \cdot DM$ $= AD^2 + BD^2 + 2BD(BM - BD)$ $= AD^2 + (BC/3)^2 + 2 \cdot BC/3 \cdot (BC/2 - BC/3)$ $= AD^2 + 2BC^2/9$ $= AD^2 + 2AB^2/9$ Hence, $7AB^2 = 9AD^2$	1 $\frac{1}{2}$ $\frac{1}{2}$ 1 $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$

31.	Class	Frequency	Cumulative frequency	1
	0-5	12	12	
	5-10	a	12+a	
	10-15	12	24+a	
	15-20	15	39+a	
	20-25	b	39+a+b	
	25-30	6	45+a+b	
	30-35	6	51+a+b	
	35-40	4	55+a+b	
	Total	70		
	$55+a+b=70$ $a+b=15$ $\text{median} = l + \frac{\frac{N}{2} - cf}{f} \times h$ $16 = 15 + \frac{35 - 24 - a}{15} \times 5$ $1 = (11 - a)/3$ $A = 8$ $55+a+b=70$ $55+8+b=70$ $B=7$			$\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$
32.	 Let AB=candle C and D are coins $\tan 60^\circ = AB/BC = h/b$ $\sqrt{3} = h/b$ $H = b\sqrt{3}$ -----(1) $\tan 30^\circ = AB/BD = h/a$ $1/\sqrt{3} = h/a$ $H = a/\sqrt{3}$ -----(2) Multiplying (1) and (2), we get $H^2 = b\sqrt{3} \times a/\sqrt{3}$ $H^2 = b a$ $H = \sqrt{ab} \text{ m}$			$\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$

33.	$\text{Mode} = l + \frac{f_1 - f_0}{2f_1 - f_2 - f_0} \times h$ $67 = 60 + \frac{15 - x}{30 - 12 - x} \times 10$ $7 = \frac{15 - x}{18 - x} \times 10$ $7x(18 - x) = 10(15 - x)$ $126 - 7x = 150 - 10x$ $3x = 150 - 126$ $3x = 24$ $x = 8$	$\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$
34.	 Let BD = river AB = CD = palm trees = h BO = x OD = 80 - x In $\triangle ABO$, $\tan 60^\circ = h/x$ $\sqrt{3} = h/x$ ----- (1) $H = \sqrt{3}x$ In $\triangle CDO$, $\tan 30^\circ = h/(80 - x)$ $1/\sqrt{3} = h/(80 - x)$ ----- (2) Solving (1) and (2), we get $x = 20$ $H = \sqrt{3}x = 34.6$ the height of the trees = h = 34.6m $BO = x = 20\text{m}$ $DO = 80 - x = 80 - 20 = 60\text{m}$	1 $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$

	OR  Let AB=Building of height 50m RT= tower of height= h m BT=AS=x m AB=ST=50 m RS=TR-TS=(h-50)m In $\triangle ARS$, $\tan 30^\circ = RS/AS$ $\frac{1}{\sqrt{3}} = (h-50)/x$ -----(1) In $\triangle RBT$, $\tan 60^\circ = RT/BT$ $\sqrt{3} = h/x$ -----(2) Solving (1) and (2), we get h= 75 from (2) x=h/$\sqrt{3}$ =75/$\sqrt{3}$ =25$\sqrt{3}$ Hence, height of the tower=h=75m Distance between the building and the tower=25$\sqrt{3}$=43.25m	1 $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$
35.	For pipe , r = 1cm Length of water flowing in 1 sec, h=0.7m=7cm Cylindrical Tank, R=40 cm , rise in water level=H Volume of water flowing in 1 sec= $\pi r^2 h = \pi \times 1 \times 1 \times 70$ =70π Volume of water flowing in 60 sec=70$\pi \times 60$ Volume of water flowing in 30 minutes=70$\pi \times 60 \times 30$ Volume of water in Tank=$\pi r^2 H = \pi \times 40 \times 40 \times H$ Volume of water in Tank= Volume of water flowing in 30 minutes $\pi \times 40 \times 40 \times H = 70\pi \times 60 \times 30$ H=78.75cm	$\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ 1 $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$

36.	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	½ ½ ½ ½
	$\frac{24}{x+y} + \frac{16}{x-y} = 6\text{-----(1)}$	
	$\frac{36}{x+y} + \frac{12}{x-y} = 6\text{-----(2)}$	½
	Let $\frac{1}{x+y} = u$ and $\frac{1}{x-y} = v$	
	Put in the above equation we get, 24u+16v=6	½
	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,	½
	12u=1	
	⇒u=1/12	
	Putting the value of u in (4), we get, v=1/4	½
	⇒ $\frac{1}{x+y} = \frac{1}{12}$ and $\frac{1}{x-y} = \frac{1}{4}$	
	⇒ x+y=12 and x-y=4	
	Thus, speed of the boat in still water = 8 km/hr,	½
	Speed of the current = 4 km/hr	½