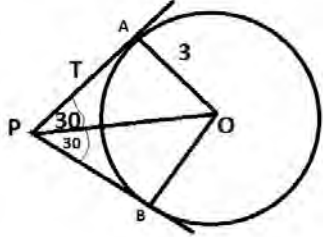
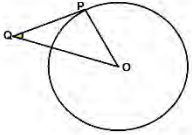


**MARKING SCHEME SQP**  
**MATHEMATICS (STANDARD)**  
**2020-21**  
**CLASS X**

S.NO.	ANSWER	MARKS
	<b>Part-A</b>	
1.	(LCM)(3) = 180 LCM=60  <b>OR</b>  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.	$\frac{3}{6} = \frac{1}{k} = \frac{3}{8}$ <del><math>\frac{3}{6} = \frac{1}{k} = \frac{3}{8}</math></del> $\frac{3}{6} = \frac{1}{k}$ $K = 2$	$\frac{1}{2}$    $\frac{1}{2}$
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.	$a_n = a + (n-1)d$ $0 = 27 + (n-1)(-3)$ $30 = 3n$ $n = 10$ $10^{\text{th}}$  <b>OR</b>  $a_n = a + (n-1)d$ $4 = a + 6(-4)$ $a = -28$	$\frac{1}{2}$  $\frac{1}{2}$       $\frac{1}{2}$ $\frac{1}{2}$
6.	$9x^2 + 6kx + 4 = 0$ $(6k)^2 - 4 \times 9 \times 4 = 0$ $36k^2 = 144$ $K^2 = 4$ $K = \pm 2$	$\frac{1}{2}$       $\frac{1}{2}$

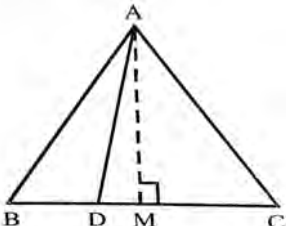
<p>7.</p>	$x^2+7x+10=0$ $x^2+5x+2x+10=0$ $(x+5)(x+2)=0$ $X=-5, x= - 2$ <p style="text-align: center;"><b>OR</b></p> $3ax^2-6x+1=0$ $(-6)^2-4(3a) (1)<0$ $12a>36 \Rightarrow a>3$	<p><math>\frac{1}{2}</math></p> <p><math>\frac{1}{2}</math></p> <p><math>\frac{1}{2}</math></p> <p><math>\frac{1}{2}</math>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

10.	$\frac{AD}{BD} = \frac{AE}{CE}$ $\frac{3}{4.5} = \frac{2}{CE}$ CE=3cm	$\frac{1}{2}$ $\frac{1}{2}$
11.	8:5	1
12.	$\sin 30^\circ + \cos B = 1$ $\frac{1}{2} + \cos B = 1$ $\cos B = 1/2$ $B = 60^\circ$	$\frac{1}{2}$ $\frac{1}{2}$
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.	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.	$\pi R^2 H = \frac{4}{3} \pi r^3$ $1 \times 1 \times 16 = \frac{4}{3} \times r^3 \times 12$ $r^3 = 1$ $r = 1$ $d = 2 \text{ cm}$	$\frac{1}{2}$ $\frac{1}{2}$
16.	probability of getting a doublet = $1/6$ <p style="text-align: center;"><b>OR</b></p> probability of getting a black queen = $2/52 = 1/26$	1
17.	(a) iii) (15/2, 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

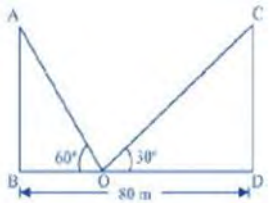
	(d) ii) $x^2 - 36$	
	(e) iii) 0	
20.	(a) iii) 43	1x4=4
	(b) iii) 60	
	(c) ii) Median	
	(d) iii) 80	
	(e) iii) 31	

Part-B		
21.	$4=2 \times 2$ $7=7 \times 1$ $14=2 \times 7$ 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)	$\frac{1}{2}$ $\frac{1}{2}$   $\frac{1}{2}$ $\frac{1}{2}$
	<b>OR</b>	
	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)	$\frac{1}{2}$ <b>1</b> $\frac{1}{2}$
23.	Sum of zeroes = $5-3\sqrt{2}+5+3\sqrt{2}=10$ Product of zeroes = $(5-3\sqrt{2})(5+3\sqrt{2})=7$ $P(x) = x^2-10x+7$	$\frac{1}{2}$ <b>1</b> $\frac{1}{2}$
24.		Line seg = $\frac{1}{2}$  Circles = $\frac{1}{2}$  Tangents = $\frac{1}{2} + \frac{1}{2}$

25.	$\tan A = \frac{3}{4} = \frac{3k}{4k}$ $\sin A = \frac{3k}{5k} = \frac{3}{5}, \cos A = \frac{4k}{5k} = \frac{4}{5}$ $\frac{1}{\sin A} + \frac{1}{\cos A}$ $= \frac{5}{3} + \frac{5}{4}$ $= \frac{(20+15)}{12}$ $= \frac{35}{12}$ <p style="text-align: center;"><b>OR</b></p> $\sqrt{3} \sin \theta = \cos \theta$ $\frac{\sin \theta}{\cos \theta} = \frac{1}{\sqrt{3}}$ $\tan \theta = \frac{1}{\sqrt{3}}$ $\theta = 30^\circ$	$\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$
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 $2 - \sqrt{3} = \frac{a}{b}$ $2 - \frac{a}{b} = \sqrt{3}$ So we get, $\frac{(2a-b)}{b} = \sqrt{3}$ Since $a$ and $b$ are integers, we get $\frac{(2a-b)}{b}$ 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.	$3x^2 + px + 4 = 0$ $3\left(\frac{2}{3}\right)^2 + p\left(\frac{2}{3}\right) + 4 = 0$ $\frac{4}{3} + \frac{2p}{3} + 4 = 0$ $P = -8$ $3x^2 - 8x + 4 = 0$ $3x^2 - 6x - 2x + 4 = 0$ $X = \frac{2}{3}$ or $x = 2$ Hence, $x = 2$	$\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$

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

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			1/2
	$\text{median} = l + \frac{\frac{N}{2} - cf}{f} \times h$ $16 = 15 + \frac{35 - 24 - a}{15} \times 5$ $1 = (11 - a)/3$ $A = 8$			1/2
	55+a+b=70 55+8+b=70 B=7			1/2
32.				1/2
	<p>Let AB=candle C and D are coins Tan60°=AB/BC=h/b √3=h/b H=b√3 -----(1)</p>			1/2
	<p>Tan30°=AB/BD=h/a 1/√3=h/a H=a/√3 -----(2)</p>			1/2
	<p>Multiplying (1) and (2), we get H²= b√3X a/√3 H²= b a</p>			1/2
	<p>H=√ab m</p>			1/2

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



OR		
	1	
<p>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 <math>\Delta ARS</math>, <math>\tan 30^\circ = RS/AS</math>  <math>\frac{1}{\sqrt{3}} = (h-50)/x</math> -----(1)</p>	$\frac{1}{2}$	
<p>In <math>\Delta RBT</math>, <math>\tan 60^\circ = RT/BT</math>  <math>\sqrt{3} = h/x</math> -----(2)</p>	$\frac{1}{2}$	
<p>Solving (1) and (2), we get                  h= 75</p>	$\frac{1}{2}$	
<p>from (2)                  x=h/<math>\sqrt{3}</math>                  =75/<math>\sqrt{3}</math>                  =25<math>\sqrt{3}</math></p>	$\frac{1}{2}$	
<p>Hence, height of the tower=h=75m                  Distance between the building and the tower=25<math>\sqrt{3}</math>=43.25m</p>	$\frac{1}{2}$	
<p><b>35.</b> 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= <math>\pi r^2 h = \pi \times 1 \times 1 \times 70</math>                  =70<math>\pi</math>                  Volume of water flowing in 60 sec=70<math>\pi \times 60</math>                  Volume of water flowing in 30 minutes=70<math>\pi \times 60 \times 30</math>                  Volume of water in Tank=<math>\pi r^2 H = \pi \times 40 \times 40 \times H</math>                  Volume of water in Tank= Volume of water flowing in 30 minutes  <math>\pi \times 40 \times 40 \times H = 70 \pi \times 60 \times 30</math>                  H=78.75cm</p>	$\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ 1 $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$	

36.	<p>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  <math>\frac{24}{x+y} + \frac{16}{x-y} = 6</math>-----(1)</p> <p><math>\frac{36}{x+y} + \frac{12}{x-y} = 6</math>-----(2)</p> <p>Let <math>\frac{1}{x+y} = u</math> and <math>\frac{1}{x-y} = v</math></p> <p>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  <math>\Rightarrow u=1/12</math>  Putting the value of u in (4), we get, v=1/4  <math>\Rightarrow \frac{1}{x+y} = \frac{1}{12}</math> and <math>\frac{1}{x-y} = \frac{1}{4}</math>  <math>\Rightarrow x+y=12</math> and <math>x-y=4</math>  Thus, speed of the boat in still water = 8 km/hr,  Speed of the current = 4 km/hr</p>	<p><math>\frac{1}{2}</math></p> <p><math>\frac{1}{2}</math></p> <p><math>\frac{1}{2}</math></p> <p><math>\frac{1}{2}</math></p> <p><math>\frac{1}{2}</math></p> <p><math>\frac{1}{2}</math></p> <p><math>\frac{1}{2}</math></p> <p><math>\frac{1}{2}</math></p> <p><math>\frac{1}{2}</math></p> <p><math>\frac{1}{2}</math></p> <p><math>\frac{1}{2}</math></p> <p><math>\frac{1}{2}</math></p>
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