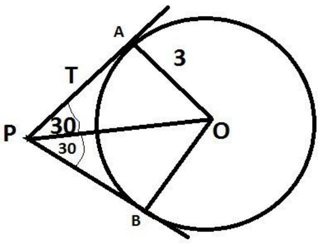
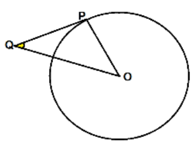
MARKING SCHEME SQP

MATHEMATICS (STANDARD)

2020-21

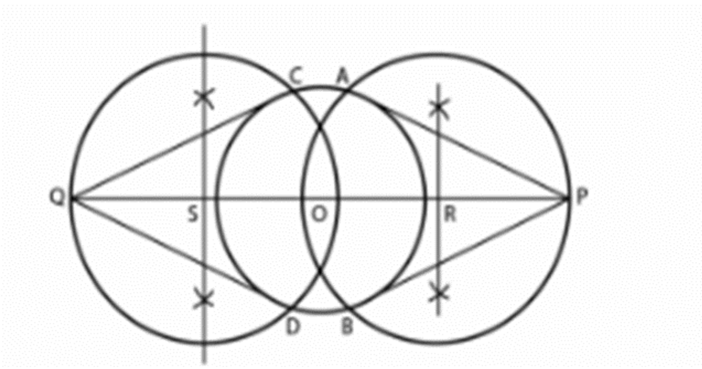
CLASS X

S.NO.	ANSWER	MARKS
	Part-A	
1.	(LCM)(3) =180 LCM=60 **OR** Four decimal places	½ ½ 1
2.	α+β=k/3 3=k/3 K=9	½ ½
3.	$\frac{3}{6}=\frac{1}{k}\neq\frac{3}{8}$ $\frac{3}{6}=\frac{1}{k}$ K=2	½ ½
4.	Let the cost of 1 chair=Rs.x And the cost of 1 table=Rs. y 3x+y=1500 6x+y=2400	½ ½
5.	a_n=a+(n-1)d 0=27+(n-1)(-3) 30=3n n =10 10^{th} **OR** an=a+(n-1)d 4=a+6x(-4) a=-28	 ½ ½ ½ ½
6.	$9x^2+6kx+4=0$ $(6k)^2-4X9X4=0$ $36k^2=144$ $K^2=4$ K=±2	 ½ ½

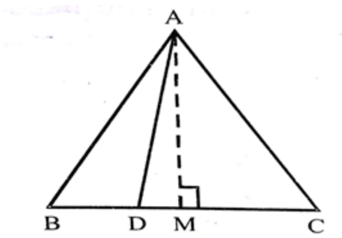
7.	$x^2+7x+10=0$ $x^2+5x+2x+10=0$ $(x+5)(x+2)=0$ $X=-5,\ x=-2$ **OR** $3ax^2-6x+1=0$ $(-6)^2-4(3a)(1)<0$ $12a>36 \Rightarrow a>3$	 ½ ½ ½ ½
8.	PQ=PT PL+LQ=PM+MT PL+LN=PM+MN Perimeter(ΔPLM) =PL+LM+PM =PL+LN+MN+PM =2(PL+LN) =2(PL+LQ) =2X28=56cm	 ½ ½
9.	 In ΔPAO Tan30°=AO/PA $1/\sqrt{3}=3/PA$ $PA=3\sqrt{3}$ cm **OR**  In ΔOPQ $<P+<Q+<O=180^\circ$ $2<Q+<P=180^\circ$ $2<Q+90^\circ=180^\circ$ $2<Q=90^\circ$ $<Q=45^\circ$	 ½ ½ ½ ½

10.	$\frac{AD}{BD}=\frac{AE}{CE}$ $\frac{3}{4.5}=\frac{2}{CE}$ CE=3cm	 ½ ½
11.	8:5	1
12.	Sin30˚+cosB=1 ½+cosB=1 CosB=1/2 B=60˚	 ½ ½
13.	x+y $=2\sin^2\Theta+2\cos^2\Theta+1$ $=2(\sin^2\Theta+\cos^2\Theta)+1$ = 3	 ½ ½
14.	length of arc=ϴ/360˚(2∏r) = 60/360(2X22/7X21) =22 cm	½ ½
15.	$\prod R^2H=12X4/3\prod r^3$ $1X1x16=4/3Xr^3$ X12 $r^3=1$ r=1 d=2cm	 ½ ½
16.	probability of getting a doublet=1/6 **OR** 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=2X2 7=7X1 14=2X7 LCM=2X2X7=28 The three bells will ring together again at 6:28 am	½ ½ ½ ½
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)	½ ½ ½ ½ ½ **1** ½
23.	Sum of zeroes= 5-3√2+5+3√2=10 Product of zeroes= (5-3√2)(5+3√2)= 7 P(x)= X^2-10x+7	½ **1** ½
24.		Line seg=1/2 Circles=1/2 Tangents =1/2+ ½

25.	tanA=3/4=3k/4k sinA=3k/5k=3/5,cosA=4k/5k=4/5 1/sinA+1/cosA =5/3+5/4 =(20+15)/12 =35/12 **OR** √3 sinΘ=cosΘ sinΘ/cosΘ=1/√3 tanΘ=1/√3 Θ=30˚	½ ½ ½ ½ ½ ½ ½ ½
26.	<A = <OPA =<OSA = 90˚ Hence, <SOP=90˚ Also, AP=AS Hence, OSAP is a square AP=AS=10cm CR=CQ=27cm BQ=BC-CQ=38-27=11cm BP=BQ=11 cm X=AB=AP+BP=10+11=21 cm	½ ½ ½ ½
27.	Let 2-√3 be a rational number We can find co-prime a and b (b≠0) such that 2-√3=a/b 2-a/b=√3 So we get,(2a-b)/b=√3 Since a and b are integers, we get (2a-b)/b is irrational and so √3 is rational. But √3 is an irrational number Which contradicts our statement Therefore 2-√3 is irrational	½ ½ ½ ½ ½ ½
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	½ ½ ½ ½ ½ ½

	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 $3(k-1)=6$ $k-1=2$ $k=3$	 ½ ½ ½ ½ ½ ½
29.	 Area of 1 segment = area of sector –area of triangle $=(90^\circ/360^\circ)\pi r^2 - ½ \times 7 \times 7$ $=1/4 \times 22/7 \times 7^2 - ½ \times 7 \times 7$ $= 14 cm^2$ Area of 8 segments=$8 \times 14 = 112\ cm^2$ Area of the shaded region = $14 \times 14 - 112$ $=196-112=84 cm^2$ *(each petal is divided into 2 segments)*	 ½ ½ ½ ½ ½ ½
30.	$\Delta ABC \sim \Delta DEF$ $\frac{Perimeter\ (\Delta ABC)}{Perimeter\ (\Delta DEF)} = \frac{AB+BC+CA}{DE+EF+FD} = \frac{AB}{DE}$ $\frac{25}{15} = \frac{9}{X}$ X=5.4cm DE=5.4cm **OR**  Construction-Draw $AM \perp BC$ BD ⊥ 1/3 BC , BM=1/2 BC In ΔABM, $AB^2=AM^2+BM^2$ $=AM^2+(BD+BM)^2$ $=AM^2+DM^2+BD^2+2BD. DM$ $=AD^2+BD^2+2BD(BM-BD)$ $=AD^2+(BC/3)^2+2. BC/3.(BC/2-BC/3)$ $=AD^2+2BC^2/9$ $=AD^2+2AB^2/9$ Hence,$7AB^2=9AD^2$	 1 ½ ½ 1 ½ ½ ½ ½ ½ ½

31.

Class	Frequency	Cumulative frequency
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	

1

½

55+a+b=70

a+b=15

median=l+$\frac{\frac{N}{2}-cf}{f}$ X h ½

16 =15+$\frac{35-24-a}{15}$ X 5

1=(11-a)/3

A=8

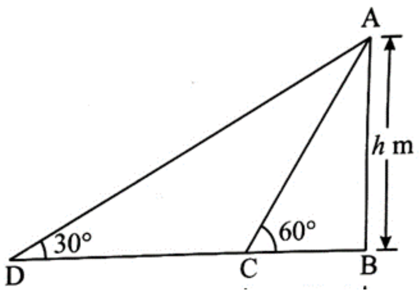
½

55+a+b=70 ½

55+8+b=70

B=7

32.



½

½

Let AB=candle

C and D are coins

Tan60˚=AB/BC=h/b

√3=h/b

H=b√3 --------------(1) ½

Tan30˚=AB/BD=h/a

1/√3=h/a

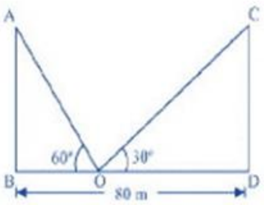
H=a/√3 --------------(2) ½

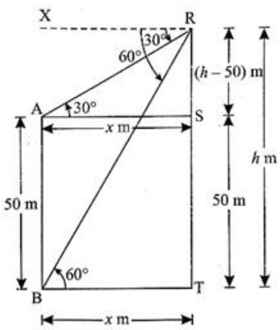
Multiplying (1) and (2), we get

H^2= b√3X a/√3 ½

H^2= b a

H=√ab m ½

33.	Mode= $l+\frac{f1-f0}{2f1-f2-f0}$ xh $67 = 60+\frac{15-x}{30-12-x}$x 10 $7 = \frac{15-x}{18-x}$x 10 7x(18-x)=10(15-x) 126-7x=150-10x 3x=150-126 3x=24 X=8	½ ½ ½ ½ ½ ½
34.	 Let BD=river AB=CD=palm trees=h BO=x OD=80-x In ∆ABO, Tan60˚=h/x √3=h/x -----------------------(1) H=√3x In ∆CDO, Tan 30˚=h/(80-x) 1/√3= h/(80-x) ---------------------(2) Solving (1) and (2), we get X=20 H=√3x=34.6 the height of the trees=h=34.6m BO=x=20m DO=80-x=80-20=60m	1 ½ ½ ½ ½ ½ ½ ½ ½

	OR	
		1
	Let AB=Building of height 50m	
	RT= tower of height= h m	½
	BT=AS=x m	
	AB=ST=50 m	½
	RS=TR-TS=(h-50)m	
	In ΔARS, tan30˚=RS/AS	
	$1/\sqrt{3} = (h-50)/x$ -------------(1)	
	In ΔRBT, tan60˚=RT/BT	½
	$\sqrt{3} = h/x$ --------------(2)	
		½
	Solving (1) and (2), we get	½
	h= 75	
	from (2)	½
	$x=h/\sqrt{3}$	
	$=75/\sqrt{3}$	½
	$=25\sqrt{3}$	
	Hence, height of the tower=h=75m	
	Distance between the building and the tower=$25\sqrt{3}$=43.25m	½
35.	For pipe , r = 1cm	½
	Length of water flowing in 1 sec, h=0.7m=7cm	½
	Cylindrical Tank,R=40 cm , rise in water level=H	½
	Volume of water flowing in 1 sec= $\prod r^2h=\prod x1x1x70$	
	$=70\prod$	½
	Volume of water flowing in 60 sec=$70\prod x60$	
		1
	Volume of water flowing in 30 minutes=$70\prod x60x30$	½
	Volume of water in Tank=$\prod r^2H=\prod x40x40xH$	½
		½
	Volume of water in Tank= Volume of water flowing in 30 minutes	½
	$\prod x40x40xH = 70\prod x60x30$	
	H=78.75cm	

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 $\frac{24}{x+y} + \frac{16}{x-y} = 6$--------(1) $\frac{36}{x+y} + \frac{12}{x-y} = 6$----------(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 ⇒u=1/12 Putting the value of u in (4), we get, v=1/4 ⇒ $\frac{1}{x+y} = \frac{1}{12}$ 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, Speed of the current = 4 km/hr	½ ½ ½ ½ ½ ½ ½ ½ ½ ½