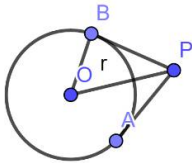
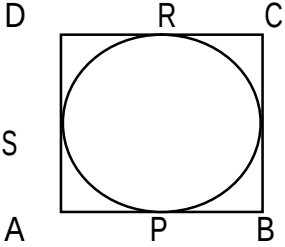


Class X
Mathematics (Standard)
SQP Marking Scheme (2019-20)

<u>Section-A</u>		
1	(c) 3 decimal places	1
2	(a) 165	1
3	(c) 20	1
4	(a) all real values except 10	1
5	(d) not defined	1
6	(a) $\sqrt{2} - 1$	1
7	(d) 30°	1
8	(d) IV quadrant	1
9	(c) 4	1
10	(a) -12	1
11	$\pi r l + 2\pi r h + \pi r^2$	1
12	4	1
	OR	
	5	1
13	49 : 81	1
14	14, 38	$\frac{1}{2} + \frac{1}{2}$
15	$\frac{3}{11}$	1
16	Rational number = 0.30	$\frac{1}{2}$
	Irrational number = 0.3010203040...	$\frac{1}{2}$
	Or any other correct rational and irrational number	
17	$\triangle ACB \sim \triangle ADC$ (AA criterion)	$\frac{1}{2}$

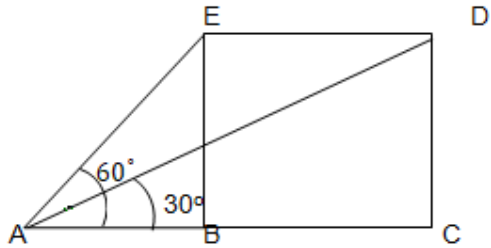
	$\Rightarrow \frac{AC}{AD} = \frac{AB}{AC}$	$\frac{1}{2}$
	$\therefore AB = 12 \text{ cm}$	
18	 In $\triangle OBP$, $\frac{OB}{OP} = \sin 30^\circ$ $\therefore OP = 2r$ OR Length of Tangent = $2 \times \sqrt{5^2 - 4^2} = 2 \times 3 \text{ cm} = 6 \text{ cm}$	$\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2} + \frac{1}{2}$
19	$b, c \text{ and } 2b \text{ are in A.P} \Rightarrow c = \frac{3b}{2}$ $\therefore b : c = 2 : 3$	$\frac{1}{2}$ $\frac{1}{2}$
20	$D = (2\sqrt{2}k)^2 - 4(1)(18) = 0 \Rightarrow k = \pm 3$	$\frac{1}{2} + \frac{1}{2}$
<u>Section-B</u>		
21	$110, 120, 130, \dots, 990$ $a_n = 990 \Rightarrow 110 + (n - 1) \times 10 = 990$ $\therefore n = 89$	1 1
22	 $AP = AS, BP = BQ, CR = CQ \text{ and } DR = DS$ $\Rightarrow AP + BP + CR + DR = AS + BQ + CQ + DS$ $Q \Rightarrow AB + CD = AD + CB$ But $AB = CD \text{ and } AD = CB$ $\therefore AB = AD$ Hence, ABCD is a square.	1 1
23	$\triangle ADE \sim \triangle GBD \text{ and } \triangle ADE \sim \triangle FEC$ $\Rightarrow \triangle GBD \sim \triangle FEC \text{ (AA Criterion)}$ $\Rightarrow \frac{GD}{FC} = \frac{GB}{FE} \Rightarrow GD \times FE = GB \times FC \text{ or } FG^2 = BG \times FC$ OR	1 1

26	Capacity of first glass = $\pi r^2 H - \frac{2}{3}\pi r^3$ $= \pi \times 9(10 - 2) = 72\pi cm^3$ Capacity of second glass = $\pi r^2 H - \frac{1}{3}\pi r^2 h$ $= \pi \times 3 \times 3(10 - 0.5) = 85.5\pi cm^3$ ∴ Suresh got more quantity of juice.	1 1
Section - C		
27	Let us assume, to the contrary, that $2\sqrt{5} - 3$ is a rational number $\therefore 2\sqrt{5} - 3 = \frac{p}{q}$, where p and q are integers and $q \neq 0$ $\Rightarrow \sqrt{5} = \frac{p+3q}{2q} \dots (1)$ Since p and q are integers $\therefore \frac{p+3q}{2q}$ is a rational number $\therefore \sqrt{5}$ is a rational number which is a contradiction as $\sqrt{5}$ is an irrational number Hence our assumption is wrong and hence $2\sqrt{5} - 3$ is an irrational number. OR $180 = 144 \times 1 + 36$ $144 = 36 \times 4 + 0$ $\therefore \text{HCF}(180, 144) = 36$ $36 = 13m - 16$ Solving, we get $m = 4$	1 1 1 2 1
28	$S_m = S_n \Rightarrow \frac{m}{2}[2a + (m-1)d] = \frac{n}{2}[2a + (n-1)d]$ $\Rightarrow 2a(m-n) + d(m^2 - m - n^2 + n) = 0$ $\Rightarrow (m-n)[2a + (m+n-1)d] = 0$ or $S_{m+n} = 0$	1 1 1
29	$x + y = 7$ and $2(x - y) + x + y + 5 + 5 = 27$ $\therefore x + y = 7$ and $3x - y = 17$ Solving, we get, $x = 6$ and $y = 1$	$\frac{1}{2} + 1$ $\frac{1}{2}$ 1

	OR Let $\frac{1}{x} = a$ and $\frac{1}{y} = b$ $\Rightarrow 21a + 47b = 110$ and $47a + 21b = 162$ Adding and subtracting the two equations, we get $a + b = 4$ and $a - b = 2$ Solving the above two equations, we get $a = 3$ and $b = 1$ $\therefore x = \frac{1}{3}$ and $y = 1$	1 1 1
30	$p(x) = x^4 + 4x^3 - 2x^2 - 20x - 15$ $x^2 - 5$ is factor of $p(x)$ $\therefore p(x) = (x^2 - 5)(x^2 + 4x + 3)$ Or $p(x) = (x^2 - 5)(x + 3)(x + 1)$ So, all the zeroes of $p(x)$ are $\sqrt{5}, -\sqrt{5}, -3$ and -1	2 1
31	(i) A(1,7), B(4,2) C(-4,4) Distance travelled by Seema = $\sqrt{34}$ units Distance travelled by Aditya = $\sqrt{68}$ units $\therefore$ Aditya travels more distance (ii) Coordinates of D are $\left(\frac{1+4}{2}, \frac{7+2}{2}\right) = \left(\frac{5}{2}, \frac{9}{2}\right)$ (iii) $\text{ar}(\Delta ABC) = \frac{1}{2}[1(2 - 4) + 4(4 - 7) - 4(7 - 2)]$ $= 17$ sq. units	1 1 1
32	$\sin \theta + \cos \theta = \sqrt{3} \Rightarrow (\sin \theta + \cos \theta)^2 = 3$ $\Rightarrow 1 + 2 \sin \theta \cos \theta = 3 \Rightarrow \sin \theta \cos \theta = 1$ $\therefore \tan \theta + \cot \theta = \frac{\sin \theta}{\cos \theta} + \frac{\cos \theta}{\sin \theta} = 1$	1 1 1

	OR $\frac{\cos^2(45^\circ+\theta)+\cos^2(45^\circ-\theta)}{\tan(60^\circ+\theta)\times\tan(30^\circ-\theta)} + (\cot 30^\circ + \sin 90^\circ) \times (\tan 60^\circ - \sec 0^\circ)$ $= \frac{\cos^2(45^\circ+\theta)+\sin^2(45^\circ+\theta)}{\tan(60^\circ+\theta)\times\cot(60^\circ+\theta)} + (\sqrt{3}+1) \times (\sqrt{3}-1)$ $= 1 + 2 = 3$	2 1
33	Required Area = Area of triangle - Area of 3 sectors Area of Triangle = $\frac{1}{2} \times 24 \times 7 = 84 \text{ m}^2$ Area of three sectors = $\frac{\pi r^2}{360^\circ} \times (\text{sum of three angles of triangle})$ $= \frac{22 \times 7 \times 7 \times 180^\circ}{7 \times 2 \times 2 \times 360^\circ} = \frac{77}{4} \text{ or } 19.25 \text{ m}^2$ $\therefore$ Required Area = $\frac{259}{4} \text{ or } 64.75 \text{ m}^2$	1 1 1
34	(i) Curve 1 - Less than ogive, Curve2 - More than ogive (ii) Median Rainfall = 21 cm (iii) 3 Median = Mode + 2 mean $\therefore$ Mode = 16.2 cm	1 1 1
<u>Section-D</u>		
35	Correct construction of given triangle Correct construction of similar Δ with scale factor $\frac{3}{4}$ OR Correct construction of given circle Correct construction of two tangents	1 3 1 3
36	For correct given, to prove, const. and figure For correct proof	$(4 \times \frac{1}{2})$ $= 2)$ 2
37	Let the original speed of the train be x km/h $\therefore \frac{360}{x} - \frac{360}{x+5} = \frac{48}{60}$ $\Rightarrow x^2 + 5x - 2250 = 0$	2 1

	$\Rightarrow (x + 50)(x - 45) = 0 \therefore x = 45$ Hence original speed of the train = 45km/h OR $\frac{1}{x} - \frac{1}{x-2} = 3$ $\frac{x-2-x}{x(x-2)} = \frac{3}{1}$ $3x^2 - 6x = -2$ $3x^2 - 6x + 2 = 0$ $x = \frac{6 \pm \sqrt{12}}{6}$ $= \frac{3+\sqrt{3}}{3}, \frac{3-\sqrt{3}}{3}$	1 1 1 1 1 1
38	Capacity of tank = $\frac{1}{3}\pi \times 20 \times (10^2 + 25^2 + 10 \times 25)m^3$ $= \pi \times 20 \times 325m^3 = \pi \times 20 \times 325 l$ Cost of petrol = $\pi \times 20 \times 325 \times 70 = ₹1430000$ Slant height = $\sqrt{20^2 + (25 - 10)^2} = 25m$ Surface area of tank = $\pi \times 25(10 + 25)m^2 = 2750m^2$ OR Quantity of water flowing through pipe in 1 hour $= \pi \times \frac{7}{100} \times \frac{7}{100} \times 15000m^3$ Required time = $\left(50 \times 44 \times \frac{21}{100}\right) \div \left(\pi \times \frac{7}{100} \times \frac{7}{100} \times 15000\right)$ $= 2 \text{ hours}$	$1\frac{1}{2}$ $\frac{1}{2}$ 1 1 2 2

39	 Correct figure In $\triangle ABE$, $\frac{BE}{AB} = \tan 60^\circ$ $\Rightarrow AB = 3000 \text{ m}$ In $\triangle DAC$, $\frac{DC}{AC} = \tan 30^\circ$ $\Rightarrow AC = 9000 \text{ m}$ $BC = AC - AB = 6000 \text{ m}$ $\therefore \text{Speed of aeroplane} = \frac{6000}{30} \text{ m/s} = 200 \text{ m/s}$	1 1 1 $\frac{1}{2}$ $\frac{1}{2}$																																													
40	<table><thead><tr><th>Daily Wages(in Rs.)</th><th>Number of Workers(f_i)</th><th>x_i</th><th>u_i</th><th>$f_i u_i$</th></tr></thead><tbody><tr><td>100-120</td><td>10</td><td>110</td><td>-3</td><td>-30</td></tr><tr><td>120-140</td><td>15</td><td>130</td><td>-2</td><td>-30</td></tr><tr><td>140-160</td><td>20</td><td>150</td><td>-1</td><td>-20</td></tr><tr><td>160-180</td><td>22</td><td>170</td><td>0</td><td>0</td></tr><tr><td>180-200</td><td>18</td><td>190</td><td>1</td><td>18</td></tr><tr><td>200-220</td><td>12</td><td>210</td><td>2</td><td>24</td></tr><tr><td>220-240</td><td>13</td><td>230</td><td>3</td><td>39</td></tr><tr><td>Total</td><td>110</td><td></td><td></td><td>1</td></tr></tbody></table> Mean daily wages = $170 + \frac{1}{110} \times 20 = ₹170.19(\text{approx.})$ Mode = $160 + \frac{22-20}{44-20-18} \times 20 = ₹166.67(\text{approx.})$	Daily Wages(in Rs.)	Number of Workers(f_i)	x_i	u_i	$f_i u_i$	100-120	10	110	-3	-30	120-140	15	130	-2	-30	140-160	20	150	-1	-20	160-180	22	170	0	0	180-200	18	190	1	18	200-220	12	210	2	24	220-240	13	230	3	39	Total	110			1	2 1 1
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