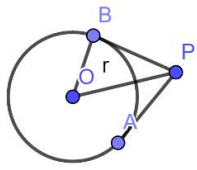
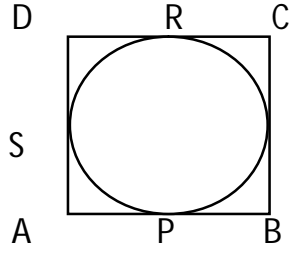
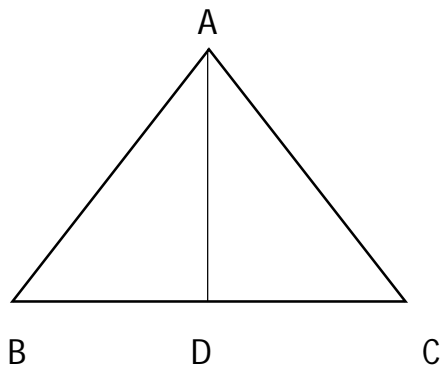


**Class X**  
**Mathematics (Standard)**  
**SQP Marking Scheme (2019-20)**

<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) $30^\circ$	1
8	(d) IV quadrant	1
9	(c) 4	1
10	(a) -12	1
11	$\pi rl + 2\pi rh + \pi r^2$	1
12	4	1
	<b>OR</b>	
	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  Irrational number = 0.3010203040...  Or any other correct rational and irrational number	$\frac{1}{2}$  $\frac{1}{2}$
17	$\Delta ACB \sim \Delta ADC$ (AA criterion)	$\frac{1}{2}$

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

	 <p> <math>AD \perp BC \therefore</math> In <math>\Delta ABD, AB^2 = AD^2 + BD^2</math>  <math>\Rightarrow AB^2 = AD^2 + \frac{BC^2}{4}</math> or <math>4AB^2 = 4AD^2 + BC^2</math>  <math>\Rightarrow 3AB^2 = 4AD^2</math> </p>	$\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$
24	<p>(i) <math>\cos(90^\circ - \theta) = \cos(3\theta - 30^\circ)</math></p> <p><math>\Rightarrow 90^\circ - \theta = 3\theta - 30^\circ \Rightarrow \theta = 30^\circ</math></p> <p>(ii) <math>\frac{AB}{AC} = \sin 30^\circ</math></p> <p><math>\therefore</math> Length of rope = <math>AC = 400\text{ m}</math></p>	<p>1</p> <p>1</p>
25	<p>For Jayanti, Favourable outcome is (6,6) i.e, 1 Probability(getting the number 36) = <math>\frac{1}{36}</math></p> <p>For Pihu, Favourable outcome is 6 i.e, 1 Probability(getting the number 36) = <math>\frac{1}{6}</math></p> <p><math>\therefore</math> Pihu has the better chance.</p> <p style="text-align: center;"><b>OR</b></p> <p>Total number of integers = 29</p> <p>(i) Prob.(prime number) = <math>\frac{6}{29}</math></p> <p>(ii) Prob.(number divisible by 7) = <math>\frac{4}{29}</math></p>	<p>1</p> <p>1</p> <p>1</p> <p>1</p>

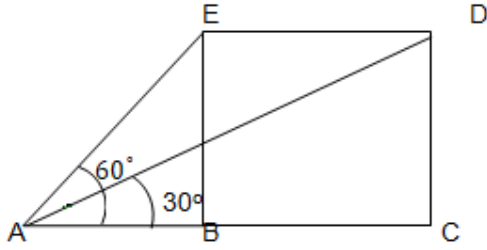
26	<p>Capacity of first glass = <math>\pi r^2 H - \frac{2}{3}\pi r^3</math>  <math>= \pi \times 9(10 - 2) = 72\pi cm^3</math></p> <p>Capacity of second glass = <math>\pi r^2 H - \frac{1}{3}\pi r^2 h</math>  <math>= \pi \times 3 \times 3(10 - 0.5) = 85.5\pi cm^3</math></p> <p>∴ Suresh got more quantity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

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

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

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

39



Correct figure

$$\text{In } \triangle ABE, \frac{BE}{AB} = \tan 60^\circ$$

$$\Rightarrow AB = 3000 \text{ m}$$

$$\text{In } \triangle DAC, \frac{DC}{AC} = \tan 30^\circ$$

$$\Rightarrow AC = 9000 \text{ m}$$

$$BC = AC - AB = 6000 \text{ m}$$

$$\therefore \text{Speed of aeroplane} = \frac{6000}{30} \text{ m/s} = 200 \text{ m/s}$$

1

1

1

 $\frac{1}{2}$  $\frac{1}{2}$ 

40

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

$$\text{Mean daily wages} = 170 + \frac{1}{110} \times 20 = ₹170.19(\text{approx.})$$

$$\text{Mode} = 160 + \frac{22-20}{44-20-18} \times 20 = ₹166.67(\text{approx.})$$

2

1

1

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