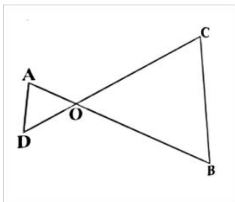
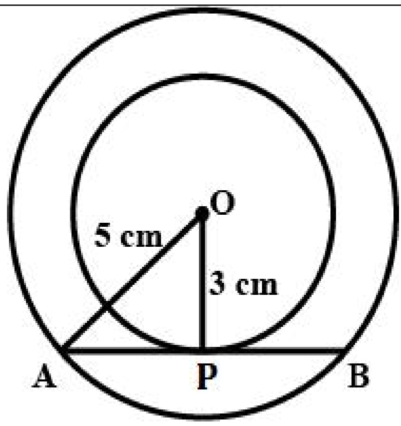
MARKING SCHEME, BSEH PRACTICE PAPER 1,10TH MATHS (STANDARD), MARCH 2024(ENGLISH MEDIUM)		
Q. no.	**Expected solutions**	**marks**
	Section-A	
1	(b)2	1
2	(c) rational number	1
3	(c) $\frac{x^2}{2} - \frac{x}{2} - 6$	1
4	(c) no real roots	1
5	(c)4	1
6	(a) (0,0)	1
7	(a) 50°	1
8	(a) 50°	1
9	Point of contact	1
10	$\frac{\sqrt{3}}{2}$	1
11	False	1
12	$\cos 90^0 = 0$	1
13	(d) $\frac{p}{720} \times 2\pi r^2$	1
14	$36.67cm$	1
15	(a) 3:7	1
16	(b) 17.5	1
17	(b)21	1
18	(c) 9	1
19	(c) Assertion(A) is true but Reason(R) is false.	1
20	(a)Both Assertion(A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion(A).	1
	Section B	
21.	The given system of equation is kx+3y−(k−3)=0.......(i) 12x+ky−k=0............(ii) On comparing with ax + by + c = 0, we get $a_1 = k, b_1 = 3$ and $c_1 = -(k – 3)$ [from (i)] $a_2 = 12$, $b_2 = k$ and $c_2 = -k$ [from (ii)] For no solution,	

	$$\frac{a_1}{a_2} = \frac{b_1}{b_2} \neq \frac{c_1}{c_2}$$ For no solution, $\frac{a_1}{a_2} = \frac{b_1}{b_2} \neq \frac{c_1}{c_2}$ $\Rightarrow \frac{k}{12} = \frac{3}{k} \neq \frac{-(k-3)}{-k}$ …………………………………………………………………………… Taking first two parts, we get $$\frac{k}{12} = \frac{3}{k}$$ $\Rightarrow k^2 = 36$ $\Rightarrow k = \pm 6$ …………………………………………………………………………… Taking last two parts, we get $$\frac{3}{k} \neq \frac{-(k-3)}{-k}$$ $\Rightarrow 3k \neq k(k - 3)$ $\Rightarrow 3k - k(k - 3) \neq 0$ $\Rightarrow k(3 - k + 3) \neq 0$ $\Rightarrow k(6 -k) \neq 0$ $\Rightarrow k \neq 0$ and $k \neq 6$ …………………………………………………………………………… Hence, required value of k for which the given pair of linear equations have no solution is -6.	1/2 1/2 1/2 1/2

OR 21	By Elimination method: Equations are 3x + 4y = 10 and 2x − 2y = 2 Multiplying equation (ii) by 2 and adding to equation (i), we $3x + 4y = 10$ $4x - 4y = 4$ $7x = 14$ $\Rightarrow \boxed{x = 2}$ Now, putting the value of x in equation (i), we get $3(2) + 4y = 10 \quad \Rightarrow 6 + 4y = 10$ $\Rightarrow 4y = 4 \quad \Rightarrow \boxed{y = 1}$	1/2 1/2 1/2 1/2
22	 OA . OB = OC . OD (Given) So, $\frac{OA}{OC} = \frac{OD}{OB}$......(1) .... Also, we have ∠ AOD = ∠ COB (Vertically opposite angles) ....(2) .... Therefore, from (1) and (2), Δ AOD ~ Δ COB (SAS similarity criterion) .... So, ∠ A = ∠ C and ∠ D = ∠ B (Corresponding angles of similar triangles)	1/2 1/2 1/2 1/2
23	Let O be the centre of the concentric circle of radii 5 cm and 3 cm respectively. Let AB be a chord of the larger circle touching the smaller circle at P.	

	 Then AP=PB and OP⊥AB .... Applying Pythagoras theorem in △OPA, we have $OA^2 = OP^2 + AP^2$ .... $\Rightarrow 25 = 9 + AP^2$ $\Rightarrow AP^2 = 16 \Rightarrow AP = 4$ cm .... $\therefore AB = 2AP = 8$ cm	1/2 1/2 1/2 1/2
24.	$\sin\theta + \cos\theta = \sqrt{3}$ $\Rightarrow (\sin\theta + \cos\theta)^2 = 3$ $\Rightarrow \sin^2\theta + \cos^2\theta + 2\sin\theta\cos\theta = 3$ .... $\Rightarrow 1 + 2\sin\theta\cos\theta = 3$ $\Rightarrow 2\sin\theta\cos\theta = 2$ $\Rightarrow \sin\theta\cos\theta = 1$	 1/2 1/2

	$\Rightarrow \sin\theta\cos\theta = \sin^2\theta + \cos^2\theta$ $\Rightarrow 1 = \dfrac{\sin^2\theta+\cos^2\theta}{\sin\theta\cos\theta}$ …………………………………………………………………………… $\Rightarrow \tan\theta + \cot\theta = 1$	1/2 1/2
OR 24	$\dfrac{5\cos^2 60°+4\sec^2 30°-\tan^2 45°}{\sin^2 30°+\cos^2 30°}$ $= \dfrac{5\times\left(\frac{1}{2}\right)^2+4\times\left(\frac{2}{\sqrt{3}}\right)^2-1}{\left(\frac{1}{2}\right)^2+\left(\frac{\sqrt{3}}{2}\right)^2}$ $= \dfrac{\frac{5}{4}+\frac{16}{3}-1}{\frac{1}{4}+\frac{3}{4}} = \mathbf{\dfrac{67}{12}}.$	 1 1
25.	Total area cleaned by 2 wipers =2× area cleaned by 1 wiper =2× area of sector with 115° …………………………………………………………………………… $=2\times \dfrac{\theta}{360°}\times\pi r^2$ …………………………………………………………………………… $=2\times\dfrac{115°}{360°}\times\dfrac{22}{7}\times 25^2$ …………………………………………………………………………… Therefore area cleaned by wipers = $\dfrac{158125}{126}$ = 1254.96 cm^2	 1/2 1/2 1/2 1/2
	Section C	
26.	Let us assume that	

	$3-2\sqrt{5}$ is rational. …………………………………………………………………… Hence it can be written in the form $\frac{a}{b}$ where a and b are co-prime and b$\neq 0$ Hence $3-2\sqrt{5} = \frac{a}{b}$ …………………………………………………………………… $\Rightarrow 2\sqrt{5} = 3 - \frac{a}{b} = \frac{3b-a}{b}$ …………………………………………………………………… $\Rightarrow \sqrt{5} = \frac{3b-a}{2b}$ …………………………………………………………………… where $\sqrt{5}$ is irrational and $\frac{3b-a}{2b}$ is rational. because irrational number$\neq$ rational number Therefore the above is a contradiction. So our assumption is wrong. …………………………………………………………………… Hence $3-2\sqrt{5}$ is irrational.	1/2 1/2 1/2 1/2 1/2 1/2
27	Since α *and* β are the zeroes of the polynomial $f(x)=5x^2 -7x +1$ $\therefore \alpha + \beta = -\left(\frac{-7}{5}\right) = \frac{7}{5}$ *and* $\alpha\beta = \frac{1}{5}$ …………………………………………………………………… Now $\frac{\alpha}{\beta} + \frac{\beta}{\alpha} = \frac{\alpha^2+\beta^2}{\alpha\beta} = \frac{(\alpha+\beta)^2-2\alpha\beta}{\alpha\beta} =$	1 1

	....	
	$$= \frac{\left(\frac{7}{5}\right)^2 - 2\times\frac{1}{5}}{\frac{1}{5}}$$ $$= \frac{\frac{49}{25}-\frac{2}{5}}{\frac{1}{5}} = \frac{\frac{49-10}{25}}{\frac{1}{5}} = \frac{39}{25}\times 5 = \frac{39}{5}$$	1

28

Given equations are

x+3y=6

x	0	6
$y=\frac{6-x}{3}$	2	0

1/2

....

and

2x- 3y=12

x	0	3
$y=\frac{2x-12}{3}$	-4	-2

1/2

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Plot the points A(0, 2), B(6, 0), P(0, – 4) and Q(3, – 2) on graph paper, and join the points to form the lines AB and PQ as shown in Fig.

We observe that there is a point B (6, 0) common to both the lines AB and PQ. So, the solution of the pair of linear equations is x = 6 and y = 0, i.e., the given pair of equations is consistent.

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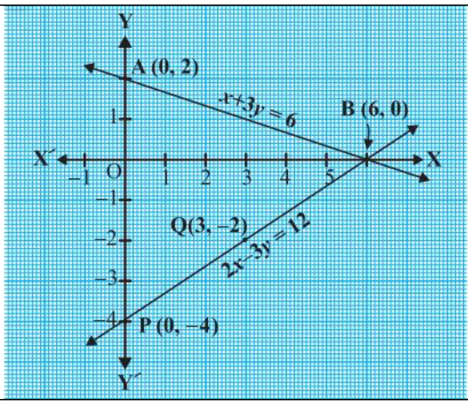
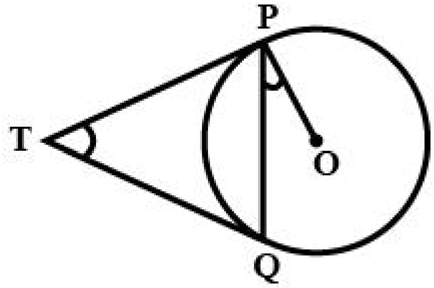
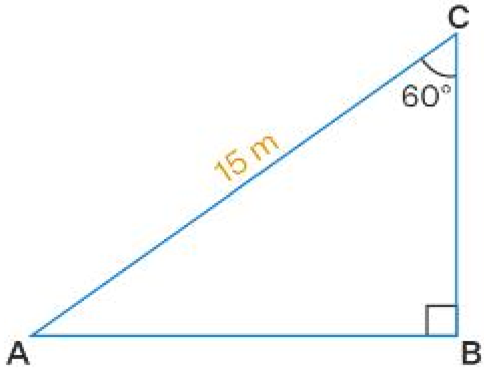
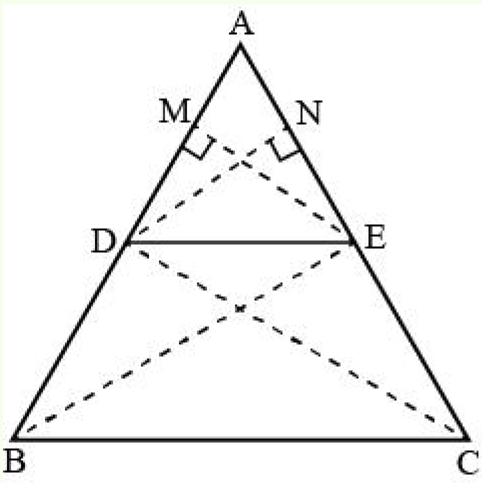
		1
OR 28	Let the numbers be xand y .According to given condition, x=3y……(i) ………………………………………………………………………… x−y=26……(ii) ………………………………………………………………………… On solving (i) and (ii) we get, x=3y [From (i)] Substituting value of x in (ii) 3y−y=26 ………………………………………………………………………… 2y=26 y=13 ………………………………………………………………………… Now, x=3y x=3(13) ⇒x=39 ………………………………………………………………………… ∴y=13,x=39 ∴ The required numbers are 13 and 39.	 1/2 1/2 1/2 1/2 1/2 1/2
29	Suppose ∠PTQ=θ Since,"The lengths of tangents drawn from an external point to a circle are equa So, ΔTPQ is an isosceles triangle. ………………………………………………………………………… ∴,∠TPQ=∠TQP= $\frac{1}{2}(180° - \theta) = 90° - \frac{\theta}{2}$ …………………………………………………………………………	1/2 1/2

		1/2
	.... Also, The tangents at any point of a circle is perpendicular to the radius through the point of contact" ∠OPT=90°	1/2
	.... $\therefore \angle OPQ = \angle OPT - \angle TPQ = 90^\circ - (90^\circ - \frac{\theta}{2})$ $= \frac{\theta}{2} = \frac{1}{2}\angle PTQ$	1/2
	.... Hence ∠PTQ=2∠OPQ	1/2
30	$\text{LHS} = (\text{cosec}\ \theta - \cot\ \theta)^2$ $= \left(\frac{1}{\sin\theta} - \frac{\cos\theta}{\sin\theta}\right)^2 = \left(\frac{1-\cos\theta}{\sin\theta}\right)^2$	1
	$= \frac{(1-\cos\theta)^2}{\sin^2\theta} = \frac{(1-\cos\theta)^2}{1-\cos^2\theta}$	1
	$= \frac{(1-\cos\theta)^2}{(1-\cos\theta)(1+\cos\theta)} = \frac{1-\cos\theta}{1+\cos\theta} = \text{RHS.}$	1
OR 30	Consider the length of the ladder = 15 m (Hypotenuse)	

	 .... From the figure Angle between the ladder and the wall ∠BCA = 60° Angle between ladder and the ground ∠CAB = 90° - 60° = 30° .... We know that BC is the height of the wall sin 30° = BC/15 .... 1/2 = BC/15 So we get .... BC = 15/2 BC = 7.5 m Therefore, the height of the wall is 7.5 m.	1/2 1/2 1 1/2 1/2
31	We use the basic formula of probability to solve the problem. Probability $= \frac{\text{Total number of favorable outcomes}}{\text{Number of possible outcomes}}$ When a coin is tossed three times, the total possible outcomes are: HHH,TTT,HTH,THT,HHT,TTH,HTT,THH i) Sweta will lose her entry fee if she throws 3 tails, Therefore, the probability that she loses her entry fee =	

	P(TTT)=1/8 .... ii) Sweta will receive double the entry fee if she throws three heads. Therefore, the probability that she gets double the entry fee = P(HHH)= 1/8 .... (iii) Sweta will get her entry fee back if one or two heads show. Therefore, the probability that she gets her entry fee = P{ HTH,THT,HHT,TTH,HTT,THH}= $\frac{6}{8} = \frac{3}{4}$	1 1 1
	SECTION D	
32.	**Step 1: Find time taken for the journey** Let the speed of the train be $x\ kmph$ Time taken for the journey $= \frac{480}{x}$ Given speed is decreased by $8\ kmph$ Hence the new speed of train $= (x-8)\ kmph$ Time taken for the journey $= \frac{480}{(x-8)}$ **Step 2: Find the speed of the train** Now according to question $\frac{480}{(x-8)} - \frac{480}{x} = 3$ $\Rightarrow \frac{480(x-x+8)}{x\ (x-8)} = 3$ $\Rightarrow \frac{480}{3} \times 8 = x^2 - 8x$ $\Rightarrow 1280 = x^2 - 8x$ $x^2 - 8x - 1280 = 0$ On solving we get $x = 40$ Hence, the speed of train is $40\ kmph$.	1 1 1 1 1
OR 32	Let the first integer number = x Next consecutive positive integer will = x+1	1

	Product of both integers = $x\times(x+1)=306$ .... $x^2+x=306$ $\Rightarrow x^2+x-306=0$ .... $\Rightarrow x^2+18x-17x-306=0$ $\Rightarrow x(x+18)-17(x+18)=0$ $\Rightarrow (x+18)(x-17)=0$ .... Either $x+18=0$ or $x-17=0$ $\Rightarrow x=-18$ or $x=17$ .... Since integers are positive x can only be 17 $\therefore x+1=17+1=18$ Therefore, two consecutive positive integers will be 17 and 18.	1/2 1/2 1 1 1
33.	**Solution:** **Given:** In ΔABC, DE‖BC **...**  **...** **To prove:** $\frac{AD}{DB}=\frac{AE}{EC}$	1/2 1/2 1/2

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	Construction : Draw EM⊥AB and DN⊥AC. Join B to E and C to D	1/2
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	Proof: In ΔADE and ΔBDE	
	$$\frac{\textbf{Area of}\,\Delta\textbf{ADE}}{\textbf{Area of}\,\Delta\textbf{BDE}} = \frac{\frac{1}{2}\times\textbf{AD}\times\textbf{EM}}{\frac{1}{2}\times\textbf{DB}\times\textbf{EM}} = \frac{\textbf{AD}}{\textbf{DB}}$$ --------------(i)	1/2
	--	
	In ΔADE and ΔCDE	
	$$\frac{\textbf{Area of}\,\Delta\textbf{ADE}}{\textbf{Area of}\,\Delta\textbf{CDE}} = \frac{\frac{1}{2}\times\textbf{AE}\times\textbf{DN}}{\frac{1}{2}\times\textbf{EC}\times\textbf{DN}} = \frac{\textbf{AE}}{\textbf{EC}}$$ --------------(ii)	1/2
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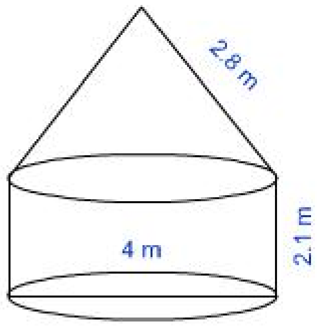
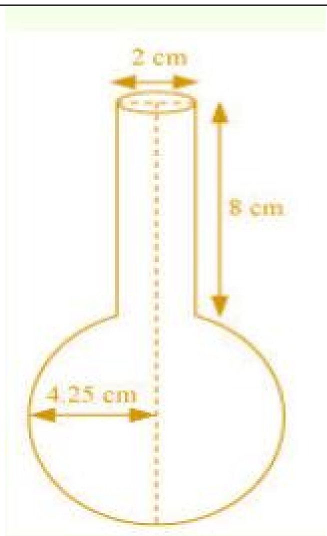
	Since, DE||BC [Given]	
	∴ ar(ΔBDE) = ar(ΔCDE) ------------------------------------ (iii) [Δs on the same base and between the same parallel sides are equal in area]	1

	--- From eq. (i), (ii) and (iii) : $\frac{\mathbf{AD}}{\mathbf{DB}} = \frac{\mathbf{AE}}{\mathbf{EC}}$ Hence proved.	1
34.	 Radius of cylinder = 2 m, height = 2.1 m and slant height of conical top = 2.8 m .... Curved surface area of cylindrical portion=2πrh=2π×2×2.1 =8.4πm^2 .... Curved surface area of conical portion=πrl =π×2×2.8 =5.6πm^2 .... Total curved surface area=8.4π+5.6π=14×22/7=44m^2 .... Cost of canvas = Rate × Surface area=500×44=Rs.22000	1 1 1 1 1

OR 34	 Radius of cylinder = 1 cm, height of cylinder = 8 cm, radius of sphere = 8.5/2cm .... Volume of cylinder=$\pi r^2 h = \pi \times (1)^2 \times 8 = 8\pi cm^3$ . ... Volume of sphere = $\frac{4}{3}\pi r^3 =$ $\frac{4}{3} \times \pi \times (8.5/2)^3 = 614125/6000\ \pi cm^3$ .... Total volume = Volume of sphere + Volume of cylinder $=(\frac{614125}{6000}+8)\pi$ $=(\frac{614125+48000}{6000})\pi$ $=346.51 cm^3$	1/2 $1\frac{1}{2}$ $1\frac{1}{2}$ $1\frac{1}{2}$

35. The cumulative frequencies with their respective class intervals are as follows.

Weight (in kg)	Frequency (f)	Cumulative frequency
40 − 45	2	2
45-50	3	5
50-55	8	13
55-60	6	19
60-65	6	25
65-70	3	28
70-75	2	30
Total(n)	30	

1

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Cumulative frequency just greater than $\frac{n}{2}(i.e. \frac{30}{2} = 15)$ is 19, belonging to class interval 55 − 60.

Median class = 55 − 60 1

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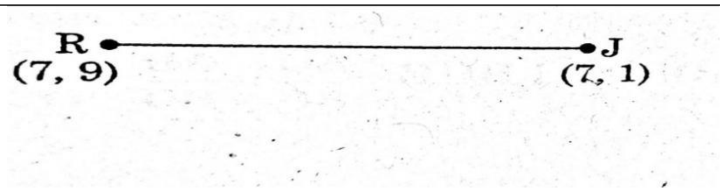
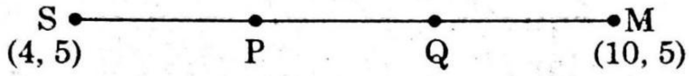
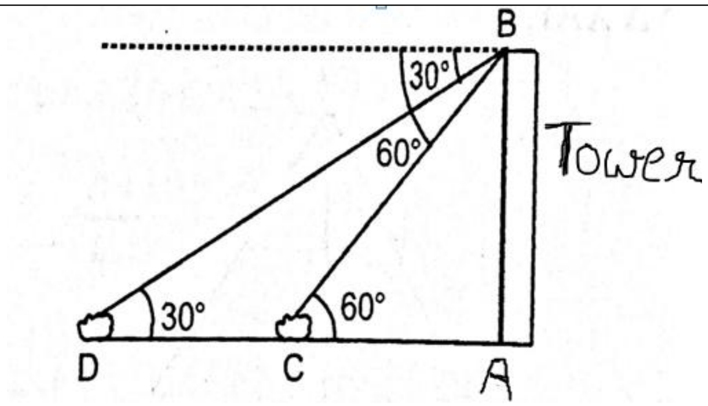
Lower limit (l) of median class = 55

Frequency (f) of median class = 6

	Cumulative frequency (cf) of class preceding the median class = 13 Class size (h) = 5 ……………………………………………………………….. Median =l + $\left(\frac{\frac{n}{2}-cf}{f}\right) \times h$ …………………………………………………………………………………... $=55 + \frac{15-13}{6} \times 5$ $=55+ \frac{10}{6}$ = 56.67 Therefore, median weight is 56.67 kg.	1 1 1
	SECTION E	
36.	(i) a = First term = 51 secs reduce time daily by 2secs d = - 2 last term a_n = 31 a+(n-1)d =31 31 = 51 + (n - 1)(-2) 10 = n - 1 n = 11 11 Terms the minimum number of days he needs to practice till his goal is achieved= 11 51 , 49 , 47 , 45 , 43 , 41 , 39 , 37 , 35 , 33 , 31	1
	(ii) Because Veer need to practice. Because of his practice, The timing required to cover the distance can be reduced. The given situation can be expressed in an arithmetic progression (AP), where the terms decrease by 2 seconds each day. Thus, the AP will be 51, 49, 47....	1
	(iii)	

	$a_n=2n+3$ $a_1=2\times 1+3=5$ $a_2=2\times 2+3=7$ $a_3=2\times 3+3=9$ $a_4=2\times 4+3=11$ .... A.P. = 5,7,9,11 d = 7-5=2	1 1
	OR (iii) Since 2x,x+10,3x+2are three consecutive terms are in AP. ∴ (x+10) -2x = (3x+2) –(x +10) ⇒ 10- x=2x-8 .... ⇒18= 3x ⇒x=6	1 1
37.	(i)) Revti' position is at (7,9) Sheela's position is at (4,5)	1
	 (ii)) RJ= $\sqrt{(7-7)^2+(1-9)^2} = \sqrt{(0)^2+(-8)^2} =$ $=\sqrt{64}=8$ units	1
	(iii)) Here SP= PQ =QM	

	 Thus, P divides SM internally in ratio 1 : 2 and divides SM internally in ratio 2 : 1. By section formula, coordinates of P are $\left(\frac{1(10)+2(4)}{1+2}, \frac{1(5)+2(5)}{1+2}\right)$ $= \left(\frac{10+8}{3}, \frac{5+10}{3}\right) = \left(\frac{18}{3}, \frac{15}{3}\right) = (6, 5)$ Now, since Q is the mid point of PM using mid-point formula, coordinates of Q are $\left(\frac{6+10}{2}, \frac{5+5}{2}\right) = \left(\frac{16}{2}, \frac{10}{2}\right) = (8, 5)$ Thus, points of trisection of SM are (6, 5) and (8, 5). .... OR (iii)) Coordinates of points R ,M and J are(7,9),(10,5)and (7,1) respectively. Using distance formula , RM= 5 MJ=5, RJ= 8 .... Here RM=M J Therefore, ΔRMJ is an isosceles triangle.	1 1 1 1
38.		

	 (i) InΔABC $\frac{AC}{AB} = cot60° \Rightarrow \frac{AC}{200\sqrt{3}} = \frac{1}{\sqrt{3}}$ $\Rightarrow \text{AC} = \frac{200\sqrt{3}}{\sqrt{3}} = 200\text{m}$ ∴The distance of the first ship from the foot of tower AC=200m .... (ii) InΔABD $\frac{\text{AD}}{\text{AB}} = \cot 30° \Rightarrow \frac{\text{AC+CD}}{200\sqrt{3}} = \sqrt{3} \Rightarrow \text{AC} + CD = \left(200\sqrt{3}\right)\left(\sqrt{3}\right)$ =600m ∴The distance of the first ship from the foot of tower AD=600m	1 1
	(iii) Distance between two ships DC=AD-AC =600-200=400m .... Area of ΔBCD $= \frac{1}{2} \times DC \times BA = \frac{1}{2} \times 400 \times 200\sqrt{3} =$ $=40000\sqrt{3}\ m^2$	1 1
	OR(iii) InΔABC	

	$\frac{AC}{BC} = \cos 60° \Rightarrow$ $\frac{200}{BC} = \frac{1}{2} \Rightarrow BC = 400$ m …………………………………………………………………… Perimeter of ΔABC= AB+BC +AC $= 200\sqrt{3} + 400 + 200 = 600 + 200\sqrt{3}$ $= 200(3 + \sqrt{3})$ m	1 1