Marking Scheme Class X Session 2023-24 MATHEMATICS STANDARD (Code No.041)

TIME: 3 hours MAX.MARKS: 80

	CECTION A	\vdash
	Section A consists of 20 questions of 1 mark each.	
1.	(b) xy ²	1
2.	(b) 1 zero and the zero is '3'	1
3.	(b) $\frac{a_1}{a_2} = \frac{b_1}{b_2} \neq \frac{c_1}{c_2}$	1
		1
4.	(c) 2 distinct real roots	1
5. 6.	(c) 7 (a) 1:2	1
7.	(d) infinitely many	1
8.	ac	1
0.	(b) $\frac{ac}{b+c}$	
		1
9. 10.	(b) 100°	1
11.	(d) 11 cm $\sqrt{b^2 - a^2}$	1
11.	(c) $\frac{\sqrt{b^2-a^2}}{a^2}$	1
40	В	
12.	(d) cos A	1
13.	(d) 60° (a) 2 units	1
14. 15.	(a) 10m	1
16.	$4-\pi$	1
10.	$(b) \frac{1}{A}$	
17.	22	1
17.	(b) $\frac{4}{6}$	
18.	(d) 150	1
19.	(a) Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of	1
	assertion (A)	
20.	(c) Assertion (A) is true but reason (R) is false.	1
	SECTION B	
21	Section B consists of 5 questions of 2 marks each.	
21.	Let us assume, to the contrary, that $\sqrt{2}$ is rational. So, we can find integers a and b such that $\sqrt{2} = \frac{a}{2}$ where a and b are coprime.	1/2
	So, we can find integers a and b such that $\sqrt{z} - where a and b are coprime.$	72
	So, b $\sqrt{2} = a$.	
	Squaring both sides,	
	we get $2b^2 = a^2$.	1/2
	Therefore, 2 divides a ² and so 2 divides a.	
	So, we can write $a = 2c$ for some integer c .	
	Substituting for a, we get $2b^2 = 4c^2$, that is, $b^2 = 2c^2$. This means that 2 divides b^2 , and so 2 divides b	1/2
	This means that 2 divides b ² , and so 2 divides b Therefore, a and b have at least 2 as a common factor.	
	But this contradicts the fact that a and b have no common factors other than 1.	1/
	This contradiction has arisen because of our incorrect assumption that $\sqrt{2}$ is rational.	1/2
	So, we conclude that $\sqrt{2}$ is irrational.	
<u> </u>	50) We continue that Y 2 is in actional.	

AB = DC = a Point P divides AB in the ratio 2:3 $AP = \frac{2}{5} a, BP = \frac{3}{5} a$ point Q divides DC in the ratio 4:1. $DQ = \frac{4}{5} a, CQ = \frac{1}{5} a$ $\Delta APO \sim \Delta CQO [AA similarity]$ $\frac{AP}{CQ} = \frac{PO}{QO} = \frac{AO}{AO}$ $\frac{AO}{CO} = \frac{4}{5} a = \frac{2}{1} \Rightarrow OC = \frac{1}{2} OA$ $\frac{AO}{CO} = \frac{4}{5} a = \frac{2}{1} \Rightarrow OC = \frac{1}{2} OA$ $\frac{AO}{CO} = \frac{4}{5} a = \frac{2}{1} \Rightarrow OC = \frac{1}{2} OA$ $\frac{AO}{CO} = \frac{4}{5} a = \frac{2}{1} \Rightarrow OC = \frac{1}{2} OA$ $\frac{AO}{CO} = \frac{4}{5} a = \frac{2}{1} \Rightarrow OC = \frac{1}{2} OA$ $\frac{AO}{CO} = \frac{4}{5} a = \frac{2}{1} \Rightarrow OC = \frac{1}{2} OA$ $\frac{AO}{CO} = \frac{4}{5} a = \frac{2}{1} \Rightarrow OC = \frac{1}{2} OA$ $\frac{AO}{CO} = \frac{4}{5} a = \frac{2}{1} \Rightarrow OC = \frac{1}{2} OA$ $\frac{AO}{CO} = \frac{4}{5} a = \frac{2}{1} \Rightarrow OC = \frac{1}{2} OA$ $\frac{AO}{CO} = \frac{4}{5} a = \frac{2}{1} \Rightarrow OC = \frac{1}{2} OA$ $\frac{AO}{CO} = \frac{4}{5} a = \frac{2}{1} \Rightarrow OC = \frac{1}{2} OA$ $\frac{AO}{CO} = \frac{4}{5} a = \frac{2}{1} \Rightarrow OC = \frac{1}{2} OA$ $\frac{AO}{CO} = \frac{4}{5} a = \frac{2}{1} \Rightarrow OC = \frac{1}{2} OA$ $\frac{AO}{CO} = \frac{4}{5} a = \frac{2}{1} \Rightarrow OC = \frac{1}{2} OA$ $\frac{AO}{CO} = \frac{4}{5} a = \frac{2}{1} \Rightarrow OC = \frac{1}{2} OA$ $\frac{AO}{CO} = \frac{4}{5} a = \frac{2}{1} \Rightarrow OC = \frac{1}{2} OA$ $\frac{AO}{CO} = \frac{4}{5} a = \frac{2}{1} \Rightarrow OC = \frac{1}{2} OA$ $\frac{AO}{CO} = \frac{4}{5} a = \frac{2}{1} \Rightarrow OC = \frac{1}{2} OA$ $\frac{AO}{CO} = \frac{4}{5} a = \frac{2}{1} \Rightarrow OC = \frac{1}{2} OA$ $\frac{AO}{CO} = \frac{AO}{CO} = \frac{AO}{CO}$ $\frac{AO}{CO} = \frac{AO}{CO}$ $\frac{AO}{CO$	22.	ABCD is a parallelogram.	1/2
$AP = \frac{2}{5} \text{ a, BP} = \frac{3}{5} \text{ a}$ $point Q \text{ divides DC in the ratio 4:1.}$ $DQ = \frac{4}{5} \text{ a, CQ} = \frac{1}{5} \text{ a}$ $\Delta \text{ APO} \sim \Delta \text{ CQO [AA similarity]}$ $\frac{AP}{CQ} = \frac{PO}{PO} = \frac{AO}{CO}$ $\frac{AO}{CO} = \frac{5}{5} \frac{a}{a} = \frac{2}{1} \implies \text{OC} = \frac{1}{2} \text{ OA}$ $\frac{AO}{CO} = \frac{5}{5} \frac{a}{a} = \frac{2}{1} \implies \text{OC} = \frac{1}{2} \text{ OA}$ $\frac{AO}{CO} = \frac{5}{5} \frac{a}{a} = \frac{2}{1} \implies \text{OC} = \frac{1}{2} \text{ OA}$ $\frac{AO}{CO} = \frac{5}{5} \frac{a}{a} = \frac{2}{1} \implies \text{OC} = \frac{1}{2} \text{ OA}$ $\frac{AO}{CO} = \frac{5}{5} \frac{a}{a} = \frac{2}{1} \implies \text{OC} = \frac{1}{2} \text{ OA}$ $\frac{AO}{CO} = \frac{5}{5} \frac{a}{a} = \frac{2}{1} \implies \text{OC} = \frac{1}{2} \text{ OA}$ $\frac{AO}{CO} = \frac{5}{5} \frac{a}{a} = \frac{2}{1} \implies \text{OC} = \frac{1}{2} \text{ OA}$ $\frac{AO}{CO} = \frac{5}{5} \frac{a}{a} = \frac{2}{1} \implies \text{OC} = \frac{1}{2} \text{ OA}$ $\frac{AO}{CO} = \frac{5}{5} \frac{a}{a} = \frac{2}{1} \implies \text{OC} = \frac{1}{2} \text{ OA}$ $\frac{AO}{CO} = \frac{5}{5} \frac{a}{a} = \frac{2}{1} \implies \text{OC} = \frac{1}{2} \text{ OA}$ $\frac{AO}{CO} = \frac{5}{5} \frac{a}{a} = \frac{2}{1} \implies \text{OC} = \frac{1}{2} \text{ OA}$ $\frac{AO}{CO} = \frac{5}{5} \frac{a}{a} = \frac{2}{1} \implies \text{OC} = \frac{1}{2} \text{ OA}$ $\frac{AO}{CO} = \frac{5}{5} \frac{a}{a} = \frac{2}{1} \implies \text{OC} = \frac{1}{2} \text{ OA}$ $\frac{AO}{CO} = \frac{5}{5} \frac{a}{a} = \frac{2}{1} \implies \text{OC} = \frac{1}{2} \text{ OA}$ $\frac{AO}{CO} = \frac{5}{5} \frac{a}{a} = \frac{2}{1} \implies \text{OC} = \frac{1}{2} \text{ OA}$ $\frac{AO}{CO} = \frac{5}{5} \frac{a}{a} = \frac{2}{1} \implies \text{OC} = \frac{1}{2} \text{ OA}$ $\frac{AO}{CO} = \frac{5}{5} \frac{a}{a} = \frac{2}{1} \implies \text{OC} = \frac{1}{2} \text{ OA}$ $\frac{AO}{CO} = \frac{5}{5} \frac{a}{a} = \frac{2}{1} \implies \text{OC} = \frac{1}{2} \text{ OA}$ $\frac{AO}{CO} = \frac{5}{5} \frac{a}{a} = \frac{2}{1} \implies \text{OC} = \frac{1}{2} \text{ OA}$ $\frac{AO}{CO} = \frac{5}{5} \frac{a}{a} = \frac{2}{1} \implies \text{OC} = \frac{1}{2} \text{ OA}$ $\frac{AO}{CO} = \frac{AO}{CO}$ $\frac{AO}{CO} = A$		AB = DC = a	
point Q divides DC in the ratio 4:1. $DQ = \frac{4}{5} a, CQ = \frac{1}{5} a$ $\Delta APO \sim \Delta CQO [AA similarity]$ $\frac{AP}{AP} = \frac{PO}{QO} = \frac{AO}{CO}$ $\frac{2}{5} \frac{1}{a} = \frac{2}{1} \Rightarrow OC = \frac{1}{2} OA$ $\frac{2}{CO} = \frac{5}{\frac{1}{5}} \frac{1}{a} = \frac{2}{1} \Rightarrow OC = \frac{1}{2} OA$ $\frac{2}{CO} = \frac{5}{\frac{1}{5}} \frac{1}{a} = \frac{2}{1} \Rightarrow OC = \frac{1}{2} OA$ $\frac{2}{CO} = \frac{5}{\frac{1}{5}} \frac{1}{a} = \frac{2}{1} \Rightarrow OC = \frac{1}{2} OA$ $\frac{2}{CO} = \frac{5}{\frac{1}{5}} \frac{1}{a} = \frac{2}{1} \Rightarrow OC = \frac{1}{2} OA$ $\frac{2}{CO} = \frac{5}{\frac{1}{5}} \frac{1}{a} = \frac{2}{1} \Rightarrow OC = \frac{1}{2} OA$ $\frac{2}{CO} = \frac{1}{\frac{1}{5}} \frac{1}{a} \Rightarrow OC = \frac{1}{2} OA$ $\frac{2}{CO} = \frac{1}{\frac{1}{5}} \frac{1}{a} \Rightarrow OC = \frac{1}{2} OA$ $\frac{2}{CO} = \frac{1}{\frac{1}{5}} \frac{1}{a} \Rightarrow OC = \frac{1}{2} OA$ $\frac{2}{CO} = \frac{1}{\frac{1}{5}} \frac{1}{a} \Rightarrow OC = \frac{1}{2} OA$ $\frac{2}{CO} = \frac{1}{\frac{1}{5}} \frac{1}{a} \Rightarrow OC = \frac{1}{2} OA$ $\frac{2}{CO} = \frac{1}{\frac{1}{5}} \frac{1}{a} \Rightarrow OC = \frac{1}{2} OA$ $\frac{2}{CO} = \frac{1}{\frac{1}{5}} \frac{1}{a} \Rightarrow OC = \frac{1}{2} OA$ $\frac{2}{CO} = \frac{1}{\frac{1}{5}} \frac{1}{a} \Rightarrow OC = \frac{1}{2} OA$ $\frac{2}{CO} = \frac{1}{\frac{1}{5}} \frac{1}{a} \Rightarrow OC = \frac{1}{2} OA$ $\frac{2}{CO} = \frac{1}{\frac{1}{5}} \frac{1}{a} \Rightarrow OC = \frac{1}{2} OA$ $\frac{1}{\frac{1}{2}} \frac{1}{\frac{1}{2}} \Rightarrow OC = \frac{1}{2} OA$ $\frac{1}{\frac$			
$DQ = \frac{4}{5} a, CQ = \frac{1}{5} a$ $\Delta APO \sim \Delta CQO [AA similarity]$ $\frac{AP}{QQ} = \frac{PO}{QO} = \frac{AO}{CO}$ $\frac{AO}{CO} = \frac{5}{5} \frac{a}{a} = \frac{2}{1} \Rightarrow OC = \frac{1}{2} OA$ $PA = PB; CA = CE; DE = DB [Tangents to a circle]$ $Perimeter of ΔPCD = PC + CD + PD$ $= PC + CCB + ED + PD$ $= PC + CA + BD + PD$ $= PA + PB$ $Perimeter of ΔPCD = PA + PA = 2PA = 2(10) = 20$ CM $24. \because tan(A + B) = \sqrt{3} \therefore A + B = 60^{\circ} \dots (1)$ $\because tan(A - B) = \frac{1}{\sqrt{3}} \therefore A - B = 30^{\circ} \dots (2)$ $Adding (1) & & (2), we get 2A = 90^{\circ} \Rightarrow A = 45^{\circ}$ $Also (1) - (2), we get 2B = 30^{\circ} \Rightarrow B = 45^{\circ}$ $[or]$ $2 cosec^{2}30 + x sin^{2}60 - \frac{3}{4} tan^{2}30 = 10$ $\Rightarrow 2(2)^{2} + x (\frac{1}{2}) - \frac{3}{4} (\frac{1}{\sqrt{3}}) = 10$ $\Rightarrow 2(4) + x (\frac{3}{4}) - \frac{3}{4} (\frac{1}{\sqrt{3}}) = 10$ $\Rightarrow 32 + x (3) - 1 = 40$ $\Rightarrow 32 + x (3) - 1 = 40$ $\Rightarrow 33 + 9 \Rightarrow x = 3$ $25. Total area removed = \frac{2A}{360} tar^{2} + \frac{2B}{360} tar^{2} + \frac{2C}{360} tar^{2}$ $= \frac{2AA + BB + 2C}{360} tar^{2}$ $= \frac{2AA + BB + 2C}{360} tar^{2}$ $= \frac{2AA + BB + 2C}{360} tar^{2}$			
$ \begin{array}{c} \Delta APO \sim \Delta CQO [AA similarity] \\ \frac{AP}{QQ} = \frac{PO}{QQ} = \frac{AO}{CQ} \\ \frac{AO}{CQ} = \frac{1}{10} = \frac{1}{10} \Rightarrow OC = \frac{1}{2} OA \\ \end{array} $			1/2
$\frac{AP}{QO} = \frac{PO}{QO} = \frac{AO}{CO}$ $\frac{AO}{CO} = \frac{5}{\frac{1}{5}a} = \frac{2}{1} \implies OC = \frac{1}{2}OA$ $PA = PB; CA = CE; DE = DB [Tangents to a circle]$ $Perimeter of \Delta PCD = PC + CD + PD$ $= PC + CE + ED + PD$ $= PC + CA + BD + PD$ $= PC + CA + BD + PD$ $= PC + CA + BD + PA = 2PA = 2(10) = 20$ cm $24. $		$DQ = \frac{1}{5}a$, $CQ = \frac{1}{5}a$	
23. $ \frac{QO}{CO} = \frac{S}{00} = \frac{CO}{CO} $ $ \frac{AO}{CO} = \frac{S}{\frac{1}{3}a} = \frac{2}{1} \Rightarrow OC = \frac{1}{2}OA $ $ \frac{AO}{CO} = \frac{S}{\frac{1}{3}a} = \frac{2}{1} \Rightarrow OC = \frac{1}{2}OA $ $ \frac{AO}{CO} = \frac{S}{\frac{1}{3}a} = \frac{2}{1} \Rightarrow OC = \frac{1}{2}OA $ $ \frac{AO}{CO} = \frac{S}{\frac{1}{3}a} = \frac{2}{1} \Rightarrow OC = \frac{1}{2}OA $ $ \frac{AO}{CO} = \frac{S}{\frac{1}{3}a} = \frac{2}{1} \Rightarrow OC = \frac{1}{2}OA $ $ \frac{AO}{CO} = \frac{S}{\frac{1}{3}a} = \frac{2}{1} \Rightarrow OC = \frac{1}{2}OA $ $ \frac{AO}{CO} = \frac{S}{\frac{1}{3}a} = \frac{2}{1} \Rightarrow OC = \frac{1}{2}OA $ $ \frac{AO}{CO} = \frac{S}{\frac{1}{3}a} = \frac{2}{1} \Rightarrow OC = \frac{1}{2}OA $ $ \frac{AO}{CO} = \frac{S}{\frac{1}{3}a} = \frac{2}{1} \Rightarrow OC = \frac{1}{2}OA $ $ \frac{AO}{CO} = \frac{S}{\frac{1}{3}a} = \frac{2}{1} \Rightarrow OC = \frac{1}{2}OA $ $ \frac{AO}{CO} = \frac{S}{\frac{1}{3}a} = \frac{2}{1} \Rightarrow OC = \frac{1}{2}OA $ $ \frac{AO}{CO} = \frac{S}{\frac{1}{3}a} = \frac{2}{1} \Rightarrow OC = \frac{1}{2}OA $ $ \frac{AO}{CO} = \frac{S}{\frac{1}{3}a} = \frac{2}{1} \Rightarrow OC = \frac{1}{2}OA $ $ \frac{AO}{CO} = \frac{S}{\frac{1}{3}a} = \frac{2}{1} \Rightarrow OC = \frac{1}{2}OA $ $ \frac{AO}{CO} = \frac{S}{\frac{1}{3}a} = \frac{2}{1} \Rightarrow OC = \frac{1}{2}OA $ $ \frac{AO}{CO} = \frac{1}{2}OA $ $ \frac{AO}{CO} = \frac{S}{1}a = \frac{2}{1} \Rightarrow OC = \frac{1}{2}OA $ $ \frac{AO}{CO} = \frac{AO}{CO} = \frac{1}{2}OA $ $ \frac{AO}{CO} = \frac{1}{2}OA $		Δ APO \sim Δ CQO [AA similarity]	1/2
23. $PA = PB; CA = CE; DE = DB [Tangents to a circle] $ Perimeter of $\Delta PCD = PC + CD + PD$ $= PC + CE + ED + PD$ $= PC + CA + BD + PD$ $= PC + CA + BD + PD$ $= PA + PB$ Perimeter of $\Delta PCD = PA + PA = 2PA = 2(10) = 20$ cm 24.		$\frac{AP}{CO} = \frac{PO}{OO} = \frac{AO}{CO}$	/2
23. PA = PB; CA = CE; DE = DB [Tangents to a circle] Perimeter of $\triangle PCD = PC + CD + PD$ = PC + CE + ED + PD = PC + CA + BD + PD = PA + PB Perimeter of $\triangle PCD = PA + PA = 2PA = 2(10) = 20$ cm 24.		$\frac{2}{40}$ $\frac{2}{5}$ $\frac{2}{5}$ $\frac{2}{5}$	1/2
23. PA = PB; CA = CE; DE = DB [Tangents to a circle] Perimeter of $\triangle PCD = PC + CD + PD$ = PC + CE + ED + PD = PC + CA + BD + PD = PA + PB Perimeter of $\triangle PCD = PA + PA = 2PA = 2(10) = 20$ cm 24.		$\frac{10}{CO} = \frac{5}{1} = \frac{1}{1} \Rightarrow OC = \frac{1}{2}OA$	
PA = PB; CA = CE; DE = DB [Tangents to a circle] Perimeter of ΔPCD = PC + CD + PD $= PC + CE + ED + PD$ $= PC + CA + BD + PD$ $= PA + PB$ Perimeter of ΔPCD = PA + PA = 2PA = 2(10) = 20 cm 24. ∴ $tan(A + B) = \sqrt{3}$ ∴ $A + B = 60^{\circ}$ (1) ∴ $tan(A - B) = \frac{1}{\sqrt{3}}$ ∴ $A - B = 30^{\circ}$ (2) $Adding (1) & & & & & & & & & & & & & & & & & & &$		co ₅ a 1	
Perimeter of $\triangle PCD = PC + CD + PD$ $= PC + CE + ED + PD$ $= PC + CA + BD + PD$ $= PA + PB$ Perimeter of $\triangle PCD = PA + PA = 2PA = 2(10) = 20$ cm $24. \because \tan(A + B) = \sqrt{3} \therefore A + B = 60^{\circ} \qquad \dots (1)$ $\because \tan(A - B) = \frac{1}{\sqrt{3}} \therefore A - B = 30^{\circ} \qquad \dots (2)$ $Adding (1) \& (2), \text{ we get } 2A = 90^{\circ} \Rightarrow A = 45^{\circ}$ $Also (1) - (2), \text{ we get } 2B = 30^{\circ} \Rightarrow B = 45^{\circ}$ $[or]$ $2 \cos c^{2}30 + x \sin^{2}60 - \frac{3}{4} \tan^{2}30 = 10$ $\Rightarrow 2(2)^{2} + x \left(\frac{3}{2}\right) - \frac{3}{4} \left(\frac{1}{3}\right) = 10$ $\Rightarrow 2(4) + x \left(\frac{3}{4}\right) - \frac{3}{4} \left(\frac{1}{3}\right) = 10$ $\Rightarrow 8 + x \left(\frac{3}{4}\right) - \frac{1}{4} = 10$ $\Rightarrow 32 + x (3) - 1 = 40$ $\Rightarrow 3x = 9 \Rightarrow x = 3$ $25. \text{Total area removed} = \frac{-2A}{360} \pi^{2} + \frac{2B}{360} \pi^{2} + \frac{2C}{360} \pi^{2}$ $= \frac{-2A4 + 2B + 2C}{360} \pi^{2}$	23.		1.
$ = PC + CE + ED + PD $ $= PC + CA + BD + PD $ $= PA + PB $ $Perimeter of \triangle PCD = PA + PA = 2PA = 2(10) = 20 $ $cm $			1/2
$ \begin{array}{c} = \text{PA} + \text{PB} \\ \text{Perimeter of } \Delta \text{PCD} = \text{PA} + \text{PA} = 2\text{PA} = 2(10) = 20 \\ \text{cm} \end{array} $ $ \begin{array}{c} 24. \\ \therefore \tan(A+B) = \sqrt{3} \therefore A+B=60^{\circ} \dots(1) \\ \therefore \tan(A-B) = \frac{1}{\sqrt{3}} \therefore A-B=30^{\circ} \dots(2) \\ \text{Adding (1) & & (2), we get } 2A=90^{\circ} \Rightarrow A=45^{\circ} \\ \text{Also (1) - (2), we get } 2B=30^{\circ} \Rightarrow B=45^{\circ} \\ \end{array} $ $ \begin{array}{c} [\text{or}] \\ \text{Implies the constraints} = \frac{\sqrt{3}}{\sqrt{3}} \frac{1}{\sqrt{3}} = 10 \\ \Rightarrow 2(2)^{2} + x(\frac{1}{2}) - \frac{3}{4}(\frac{1}{\sqrt{3}}) = 10 \\ \Rightarrow 2(4) + x(\frac{3}{4}) - \frac{3}{4}(\frac{1}{3}) = 10 \\ \Rightarrow 32 + x(3) - 1 = 40 \\ \Rightarrow 3x = 9 \Rightarrow x = 3 \\ \end{array} $ $ \begin{array}{c} \text{25.} \\ \text{Total area removed} = \frac{2A}{360} \pi r^{2} + \frac{2B}{360} \pi r^{2} + \frac{2C}{360} \pi r^{2} \\ = \frac{2AA + 2B + 2C}{360} \pi r^{2} \end{array} $			
Perimeter of $\triangle PCD = PA + PA = 2PA = 2(10) = 20$ cm 24.			
24. $ \frac{\tan(A+B)}{\tan(A+B)} = \frac{\sqrt{3}}{3} \therefore A+B=60^{\circ} \dots (1) $ $ \frac{1}{2} \therefore \tan(A+B) = \frac{1}{\sqrt{3}} \therefore A-B=30^{\circ} \dots (2) $ $ \frac{1}{2} Adding (1) \& (2), \text{ we get } 2A=90^{\circ} \Rightarrow A=45^{\circ} $ $ \frac{1}{2} \text{Also } (1)-(2), \text{ we get } 2B=30^{\circ} \Rightarrow B=45^{\circ} $ $ \boxed{\text{[or]}} $ $ 2 \csc^{2}30 + x \sin^{2}60 - \frac{3}{4} \tan^{2}30 = 10 $ $ \Rightarrow 2(2)^{2} + x \left(\frac{3}{2}\right) - \frac{3}{4} \left(\frac{1}{\sqrt{3}}\right) = 10 $ $ \Rightarrow 2(4) + x \left(\frac{3}{4}\right) - \frac{3}{4} \left(\frac{1}{3}\right) = 10 $ $ \Rightarrow 8 + x \left(\frac{1}{4}\right) - \frac{1}{4} = 10 $ $ \Rightarrow 32 + x (3) - 1 = 40 $ $ \Rightarrow 3x = 9 \Rightarrow x = 3 $ $ 25. \boxed{\text{Total area removed }} = \frac{2A}{360} \frac{\pi r^{2}}{360} + \frac{2C}{360} \pi r^{2} + \frac{2C}{360} \pi r^{2} $ $ = \frac{2A+2A+2C}{360} \pi r^{2} $			
24.		\sim R/S	1/2
Adding (1) & (2), we get $2A = 90^{\circ} \Rightarrow A = 45^{\circ}$ Also (1) -(2), we get $2B = 30^{\circ} \Rightarrow B = 45^{\circ}$ [or] $2 \csc^{2}30 + x \sin^{2}60 - \frac{3}{4} \tan^{2}30 = 10$ $\Rightarrow 2(2)^{2} + x \left(\frac{3}{2}\right) - \frac{3}{4} \left(\frac{1}{\sqrt{3}}\right) = 10$ $\Rightarrow 2(4) + x \left(\frac{3}{4}\right) - \frac{3}{4} \left(\frac{1}{\sqrt{3}}\right) = 10$ $\Rightarrow 8 + x \left(\frac{1}{\sqrt{3}}\right) - \frac{1}{\sqrt{3}} = 10$ $\Rightarrow 32 + x (3) - 1 = 40$ $\Rightarrow 3x = 9 \Rightarrow x = 3$ 25. Total area removed $= \frac{\angle A}{360} \pi r^{2} + \frac{\angle B}{360} \pi r^{2} + \frac{\angle C}{360} \pi r^{2}$ $= \frac{\angle A + \angle B + \angle C}{360} \pi r^{2}$	24.		1/2
Adding (1) & (2), we get $2A = 90^{\circ} \Rightarrow A = 45^{\circ}$ Also (1) -(2), we get $2B = 30^{\circ} \Rightarrow B = 45^{\circ}$ [or] $2 \csc^{2}30 + x \sin^{2}60 - \frac{3}{4} \tan^{2}30 = 10$ $\Rightarrow 2(2)^{2} + x \left(\frac{3}{2}\right) - \frac{3}{4} \left(\frac{1}{\sqrt{3}}\right) = 10$ $\Rightarrow 2(4) + x \left(\frac{3}{4}\right) - \frac{3}{4} \left(\frac{1}{\sqrt{3}}\right) = 10$ $\Rightarrow 8 + x \left(\frac{1}{\sqrt{3}}\right) - \frac{1}{\sqrt{3}} = 10$ $\Rightarrow 32 + x (3) - 1 = 40$ $\Rightarrow 3x = 9 \Rightarrow x = 3$ 25. Total area removed $= \frac{\angle A}{360} \pi r^{2} + \frac{\angle B}{360} \pi r^{2} + \frac{\angle C}{360} \pi r^{2}$ $= \frac{\angle A + \angle B + \angle C}{360} \pi r^{2}$			1/2
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$2 \csc^{2}30 + x \sin^{2}60 - \frac{3}{4} \tan^{2}30 = 10$ $\Rightarrow 2(2)^{2} + x \left(\frac{3}{2}\right)^{2} - \frac{3}{4} \left(\frac{1}{\sqrt{3}}\right)^{2} = 10$ $\Rightarrow 2(4) + x \left(\frac{3}{4}\right)^{2} - \frac{3}{4} \left(\frac{1}{3}\right)^{2} = 10$ $\Rightarrow 8 + x \left(\frac{3}{4}\right)^{2} - \frac{1}{4} = 10$ $\Rightarrow 32 + x \left(3\right)^{2} - 1 = 10$ $\Rightarrow 32 + x \left(3\right)^{2} - 1 = 40$ $\Rightarrow 3x = 9 \Rightarrow x = 3$ $25. Total area removed = \frac{2A}{360} \pi r^{2} + \frac{2B}{360} \pi r^{2} + \frac{2C}{360} \pi r^{2}$ $= \frac{2A + 2B + 2C}{360} \pi r^{2}$			1/2
$\Rightarrow 2(2)^{2} + x\left(\frac{\sqrt{3}}{2}\right)^{2} - \frac{3}{4}\left(\frac{1}{\sqrt{3}}\right)^{2} = 10$ $\Rightarrow 2(4) + x\left(\frac{3}{4}\right) - \frac{3}{4}\left(\frac{1}{3}\right) = 10$ $\Rightarrow 8 + x\left(\frac{1}{4}\right) - \frac{1}{4} = 10$ $\Rightarrow 32 + x(3) - 1 = 40$ $\Rightarrow 3x = 9 \Rightarrow x = 3$		[or]	
$\Rightarrow 2(2)^{2} + x\left(\frac{\sqrt{3}}{2}\right)^{2} - \frac{3}{4}\left(\frac{1}{\sqrt{3}}\right)^{2} = 10$ $\Rightarrow 2(4) + x\left(\frac{3}{4}\right) - \frac{3}{4}\left(\frac{1}{3}\right) = 10$ $\Rightarrow 8 + x\left(\frac{1}{4}\right) - \frac{1}{4} = 10$ $\Rightarrow 32 + x(3) - 1 = 40$ $\Rightarrow 3x = 9 \Rightarrow x = 3$		$2 \csc^2 30 + x \sin^2 60 - \frac{3}{4} \tan^2 30 = 10$	
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$32 + x(3) - 1 = 40$ $\Rightarrow 3x = 9 \Rightarrow x = 3$ 25. Total area removed = $\frac{\angle A}{360} \pi r^2 + \frac{\angle B}{360} \pi r^2 + \frac{\angle C}{360} \pi r^2$ $= \frac{\angle A + \angle B + \angle C}{360} \pi r^2$		$\Rightarrow 2(2)^2 + x(\frac{\sqrt{3}}{2}) - \frac{3}{4}(\frac{1}{\sqrt{3}}) = 10$	1
$32 + x(3) - 1 = 40$ $\Rightarrow 3x = 9 \Rightarrow x = 3$ 25. Total area removed = $\frac{\angle A}{360} \pi r^2 + \frac{\angle B}{360} \pi r^2 + \frac{\angle C}{360} \pi r^2$ $= \frac{\angle A + \angle B + \angle C}{360} \pi r^2$		$\Rightarrow 2(4) + x(\frac{3}{2}) - \frac{3}{2}(\frac{1}{2}) = 10$	4,
$32 + x(3) - 1 = 40$ $\Rightarrow 3x = 9 \Rightarrow x = 3$ 25. Total area removed = $\frac{\angle A}{360} \pi r^2 + \frac{\angle B}{360} \pi r^2 + \frac{\angle C}{360} \pi r^2$ $= \frac{\angle A + \angle B + \angle C}{360} \pi r^2$		$\Rightarrow 8 + x \stackrel{\cancel{3}}{\cancel{3}} = 10$	1/2
$32 + x(3) - 1 = 40$ $\Rightarrow 3x = 9 \Rightarrow x = 3$ 25. Total area removed = $\frac{\angle A}{360} \pi r^2 + \frac{\angle B}{360} \pi r^2 + \frac{\angle C}{360} \pi r^2$ $= \frac{\angle A + \angle B + \angle C}{360} \pi r^2$		$\binom{4}{4}$	
25. Total area removed = $\frac{\angle A}{360} \pi r^2 + \frac{\angle B}{360} \pi r^2 + \frac{\angle C}{360} \pi r^2$		$\Rightarrow 32 + x(3) - 1 = 40$	1/2
$= \frac{\frac{180}{360} \pi r^2}{\frac{1}{360} \pi r^2}$ $= \frac{180}{360} \pi r^2$	25	$\Rightarrow 3X = 9 \Rightarrow X = 3$ Total area removed $= \angle A \pi r^2 + \angle B \pi r^2 + \angle C \pi r^2$	1/2
$= \frac{180}{360} \pi r^2$ $= \frac{180}{360} \pi r^2$ 1/2	20.	$\frac{1}{360} \frac{10}{360} \frac{1}{360} \frac{1}{360} \frac{1}{360}$ $\frac{2A + 2B + 2C}{2}$	/2
$=\frac{180}{360}\pi r^2$		$=\frac{100}{360}\pi r^2$	
17		$=\frac{180}{360}\pi r^2$	1/2
$= \frac{180}{16} \times \frac{22}{16} \times \frac{1}{16}$		$= \frac{180}{12} \times \frac{22}{12} \times (14)^2$	1/
$= \frac{360}{360} \times \frac{7}{7} \times (14)^{2}$ $= 308 \text{ cm}^{2}$		360 7 - 308 cm ²	1/2
[or]			
The side of a square = Diameter of the semi-circle = a		-	
Area of the unshaded region Area of a square of side 'a' + 4(Area of a semi-circle of diameter 'a')			1/2
= Area of a square of side 'a' + 4(Area of a semi-circle of diameter 'a') The horizontal/vertical extent of the white region = 14-3-3 = 8 cm			1/5
Radius of the semi-circle + side of a square + Radius of the semi-circle = 8 cm			

	2 (radius of the semi-circle) + side of a square = 8 cm	
	$2a - 0$ am $\rightarrow a - 4$ am	1/
	$2a = 8 \text{ cm} \Rightarrow a = 4 \text{ cm}$	1/2
	Area of the unshaded region	
	= Area of a square of side 4 cm + 4 (Area of a semi-circle of diameter 4 cm) $(4)^{2} + 4 \times 1 = (2)^{2} - 16 + 9 = 20$	1/
	= $(4)^2 + 4 X \frac{1}{2} \pi (2)^2 = 16 + 8\pi \text{ cm}^2$	1/2
	SECTION C	
	Section C consists of 6 questions of 3 marks each	
26.	Number of students in each group subject to the given condition = HCF (60,84,108)	1/2
	HCF (60.84.108) = 12	1/2
	Number of groups in Music = $\frac{60}{2}$	
	Number of groups in Music = $\frac{60}{12}$ = 5 Number of groups in Dance = $\frac{84}{12}$ = 7	1/2
	Number of groups in Dance = $\frac{31}{12}$ = 7	1/2
	Number of groups in Handicrafts = $\frac{108}{100}$ = 9	1/2
	Number of groups in Handicraits = = 9	1/2
	Total number of rooms required = 21	
27.	$P(x) = 5x^{2} + 5x + 1$ $\alpha + \beta = \frac{-b}{a} = \frac{-5}{5} = -1$ $\alpha \beta = \frac{c}{a} = \frac{1}{5}$	1/2
	$\alpha + \beta = \frac{-b}{1} = \frac{-5}{1} = -1$	
	$\stackrel{\cdot}{c}a$ 5	1/2
	$\alpha\beta = \frac{1}{\alpha} = \frac{1}{5}$	1/2
	$\alpha^2 + \beta^2 = (\alpha + \beta)^2 - 2\alpha\beta$	
	$=(-1)^2-2$	1/2
	$\left(\frac{1}{5}\right)$	
	$=1-\frac{2}{1}=\frac{3}{1}$	1/2
	1 ⁵ 5	١.,
	$\alpha^{-1} + \beta^{-1} = \frac{1}{\alpha} + \frac{1}{\alpha}$	1/2
	$\alpha^{2} + \beta^{2} = (\alpha + \beta)^{2} - \frac{2}{4}\alpha\beta$ $= (-1)^{2} - 2 \frac{3}{5}$ $= 1 - \frac{2}{5} = \frac{3}{5}$ $\alpha^{-1} + \beta^{-1} = \frac{1}{\alpha} + \frac{1}{\beta}$ $= \frac{(\alpha + \beta)}{\alpha\beta} = \frac{(-1)}{5} = -5$	
	$=\frac{(u+p)}{1}=\frac{(1)}{1}=-5$	
	$lphaeta$ $\frac{-}{5}$	
28.	Let the ten's and the unit's digits in the first number be x and y, respectively.	
	So, the original number = $10x + y$	
	When the digits are reversed, x becomes the unit's digit and y becomes the ten's	
	Digit.	1/2
	So the obtain by reversing the digits= $10y + x$	
	According to the given condition.	
	(10x + y) + (10y + x) = 66	
	i.e., $11(x + y) = 66$	1/2
	i.e., $x + y = 6 (1)$	
	We are also given that the digits differ by 2,	1/2
	therefore, either $x - y = 2 - (2)$	1/2
	or $y - x = 2 (3)$	
	If $x - y = 2$, then solving (1) and (2) by elimination, we get $x = 4$ and $y = 2$.	1/2
	In this case, we get the number 42.	1,
	If $y - x = 2$, then solving (1) and (3) by elimination, we get $x = 2$ and $y = 4$.	1/2
	In this case, we get the number 24.	
	Thus, there are two such numbers 42 and 24.	
	[or]	11
	Let $\frac{1}{\sqrt{x}}$ be 'm' and $\frac{1}{\sqrt{y}}$ be 'n',	1/2
	Then the given equations become	
	2m + 3n = 2	1/
1	4m - 9n = -1	1/2

	$(2m + 3n = 2) X-2 \Rightarrow -4m - 6n = -4$ (1)	
	4m - 9n = -1 $4m - 9n = -1$ (2)	
	Adding (1) and (2)	
	We get $-15n = -5 \Rightarrow n = \frac{1}{3}$	1/2
	3	
	Substituting $n = \frac{1}{2}$ in $2m + 3n = 2$, we get	
	2m + 1 = 2	1/2
	2m + 1 = 2 $2m = 1$	
		1
	$\mathbf{m} = \frac{1}{2}$	1
	$m = \frac{1}{2} \implies \sqrt{x} = 2 \implies x = 4 \text{ and } n = \frac{1}{3} \implies \sqrt{y} = 3 \implies y = 9$	
29.		
	$\angle OAB = 30^{\circ}$	
	$\angle OAP = 90^{\circ}$ [Angle between the tangent and	
	the radius at the point of contact]	
	$\angle PAB = 90^{\circ} - 30^{\circ} = 60^{\circ}$	1/2
	AP = BP [Tangents to a circle from an external point]	
	$\angle PAB = \angle PBA$ [Angles opposite to equal sides of a triangle]	1/2
	In $\triangle ABP$, $\angle PAB + \angle PBA + \angle APB = 180^{\circ}$ [Angle Sum Property]	
	$60^{\circ} + 60^{\circ} + \angle APB = 180^{\circ}$	
	$\angle APB = 60^{\circ}$	1/2
	\therefore \triangle ABP is an equilateral triangle, where AP = BP = AB.	
	PA = 6 cm	1/2
	In Right ΔOAP, ∠OPA = 30°	
	$\tan 30^\circ = \frac{OA}{PA}$	
	$PA \ 1 \qquad OA$	1/2
	$\frac{1}{\sqrt{3}} = \frac{OA}{6}$	
	$OA = \frac{6}{\sqrt{3}} = 2\sqrt{3}cm$	1/2
	[or]	
	L J	
	Let $\angle TPQ = \theta$	
	∠ TPO = 90° [Angle between the tangent and	
		1/2
	the radius at the point of contact]	
	$\angle OPQ = 90^{\circ} - \theta$	
	TP = TQ [Tangents to a circle from an external	
	point]	1/2
	$\angle TPQ = \angle TQP = \theta$ [Angles opposite to equal sides of a triangle]	1/2
	In $\triangle PQT$, $\angle PQT + \angle QPT + \angle PTQ = 180^{\circ}$ [Angle Sum Property]	1/2
	$\theta + \theta + \angle PTQ = 180^{\circ}$	
	$\angle PTQ = 180^{\circ} - 2 \theta$	1/2
	$\angle PTQ = 2 (90^{\circ} - \theta)$	1/2
	$\angle PTQ = 2 \angle OPQ [using (1)]$	
30.	Given, $1 + \sin^2\theta = 3 \sin\theta \cos\theta$	
	Dividing both sides by $\cos^2\theta$,	
	$\frac{1}{\cos^2\theta} + \tan^2\theta = 3\tan\theta$	
	$cos^2 \theta$ $sec^2 \theta$ + $tan^2 \theta$ = 3 $tan \theta$	1/2
	$1 + \tan^2\theta + \tan^2\theta = 3 \tan \theta$	1/2
	$1 + 2 \tan^2 \theta = 3 \tan \theta$	1/2
1	$2 \tan^2 \theta - 3 \tan \theta + 1 = 0$	1/2
	2 (a)120 - 3 (a)10 + 1 = 0	
	If $\tan \theta = x$, then the equation becomes $2x^2 - 3x + 1 = 0$	

	$\Rightarrow (x-1)(2x-1) = 0 \text{ x} = 1 \text{ or } \frac{1}{2}$						
	$\tan \theta = 1 \text{ or } \frac{1}{2}^2$				1		
31.							
	Length [in mm]	Number of leaves (f)	CI	Mid x	d	fd	
	118 - 126 3 117.5- 126.5 122 -27 -81						
	127 - 135 5 126.5 - 135.5 131 -18 -90						
	136 - 144 9 135.5 - 144.5 140 -9 -81						
	145 - 153	12	144.5 - 153.5	a = 149	0	0	
	154 - 162	5	153.5 – 162.5	158	9	45	2
	163 - 171	4	162.5 – 171.5	167	18	72	1/2
	172 - 180	2	171.5 – 180.5	176	27	54	1/2
		Mean	$= a + \frac{\sum fd}{\sum f}$				
			$\frac{\overline{\Sigma}f}{= 149 - 2.025 = 1}$	40 146.975			
	Average length	of the leaves =					
	SECTION D						
	Section D consists of 4 questions of 5 marks each						
32.	Let the speed of the stream be x km/h.						
	The speed of the boat upstream = $(18 - x)$ km/h and the speed of the boat downstream = $(18 + x)$ km/h.					1	
	$\frac{distance}{distance} = \frac{24}{distance}$ The time taken to go upstream = $\frac{distance}{distance} = \frac{24}{distance}$						1
	i ne ume	e taken to go u	spec	$\frac{-}{\text{ed}} = \frac{-}{18-x}$ in stance 24	ours		
	the time	taken to go do	ownstream =		- hours		1
	According to	o the question	,	ρεεα 1012	•		
			$\frac{24}{18-x} - \frac{24}{18+x}$	= 1			1
	$24(18 + x) - 24(18 - x) = (18 - x) (18 + x)$ $x^{2} + 48x - 324 = 0$						
	x = 6 or -54 Since x is the speed of the stream, it cannot be negative					1	
	Since x is the speed of the stream, it cannot be negative. Therefore, $x = 6$ gives the speed of the stream $= 6$ km/h.						
	[or]					1	
	Let the time taken by the smaller pipe to fill the tank = x hr.						
	Time taken by the larger pipe = $(x - 10)$ hr					1/2	
	Part of the tank filled by smaller pipe in 1 hour = $\frac{1}{x}$						
	Part of the tank filled by larger pipe in 1 hour = $\frac{x}{1}$						1
	The tank can be filled in $9\frac{3}{8} = \frac{75}{8}$ hours by both the pipes together.					1/2	
	Part of the tank filled by both the pipes in 1 hour = $\frac{8}{75}$					1/2	

	1 1 8	1
	Therefore, $\frac{1}{x} + \frac{1}{x - 10} = \frac{8}{75}$	1/2
	$8x^2 - 230x + 750 = 0$	/2
	$x = 25, \frac{30}{8}$	1
	8 Time taken by the smaller pipe cannot be 30/8 = 3.75 hours, as the time taken by	1/2
	the larger pipe will become negative, which is logically not possible.	
	Therefore, the time taken individually by the smaller pipe and the larger pipe will be 25 and $25 - 10 = 15$ hours, respectively.	1/2
	the larger pipe win be 23 and 25 To -15 hours, respectively.	
33.	(a) Statement – ½	
	Given and To Prove – $\frac{1}{2}$ Figure and Construction $\frac{1}{2}$	3
	Proof - 1 ½	
	[b] Draw DG BE In \triangle ABE, $\frac{AB}{L} = \frac{AE}{L}$ [BPT]	1/2
	In \triangle ABE, ${BD} - {GE}$ [BP1]	/2
		1,
	$CF = FD \qquad [F \text{ is the midpoint of DC}](i)$ $DF = GE \qquad 1 [Mithen in the property of t$	1/2
	In \triangle CDG, $\frac{DF}{CF} = \frac{GE}{CE} = 1$ [Mid point theorem]	1/2
	GE = CE(ii)	
	∠CEF = ∠CFE [Given] CF = CE [Sides opposite to equal angles](iii)	1/2
	From (ii) & (iii) CF = GE(iv)	/2
	From (i) & (iv) GE = FD	
	$\therefore \frac{AB}{BD} = \frac{AE}{GE} \Rightarrow \frac{AB}{BD} = \frac{AE}{FD}$	
34.		
	Length of the pond, $l=50m$, width of the pond, $b=44m$	
	Water level is to rise by, h = 21 cm = $\frac{100}{100}$ m	
	Volume of water in the pond = $100 \text{ J} = 100 \text{ J} $	1
	Diameter of the pipe = 14 cm	
	Radius of the pipe, $r = 7cm = \frac{7}{100}m$	
	Area of cross section of nine $= \pi r^2$	
	$= \frac{22}{7} \times \frac{7}{100} \times \frac{7}{100} = \frac{154}{10000} \text{m}^2$	1
	7 100 100 10000 Rate at which the water is flowing through the pipe, h = 15km/h = 15000 m/h	1/2
	Volume of water flowing in 1 hour = Area of cross-section of pipe x height of water	1/2
	coming out of pipe	4
	$= \left(\frac{154}{10000} \times 15000\right) m^3$ Time required to fill the pend $\frac{154}{Volume\ of\ the\ pond}$	1
	1 IIIIe 1 e0 IIII e0 10 IIII III e D0 III -	1
	Volume of water flowing in 1 hour 462×10000 $= \frac{462 \times 10000}{1000} = 2 \text{ hours}$	
	$= \frac{462 \times 10000}{154 \times 15000} = 2 \text{ hours}$ Speed of water if the rise in water level is to be attained in 1 hour = 30km/h	
	[or]	
	[~1]	

	Dedice of the ordinal cont (a) 14 m	
	Radius of the cylindrical tent (r) = 14 m Total height of the tent = 13.5 m	
	Height of the cylinder = 3 m	
	Height of the Conical part = 10.5 m	1/2
	Slant height of the cone $(l) = \sqrt{h^2 + r^2}$	/2
	· · · · · · · · · · · · · · · · · · ·	
	- V(10.5)- + (14)-	
	$=\sqrt{110.25+196}$	1
	$=\sqrt{306.25}=17.5 \text{ m}$	
	Curved surface area of cylindrical portion	
	$=2\pi rh$	
	$=2x\frac{22}{2}\times14\times3$	1
	$= 264 \text{ m}^2$	
	Curved surface area of conical portion	
	=πrl	
	$=\frac{22}{12}\times14\times17.5$	
	7	1
	$=770 \text{ m}^2$	1/2
	Total curved surface area = $264 \text{ m}^2 + 770 \text{ m}^2 = 1034 \text{ m}^2$	
	Provision for stitching and wastage = 26 m^2	
	Area of canvas to be purchased = 1060 m^2	1/2
	Cost of canvas = Rate × Surface area	1,
	oost of carras – Nate & Surface area	1/2
	$= 500 \times 1060 = ₹ 5,30,000/-$	
35.		
1		

Marks obtained	Number of students	Cumulative frequency
20 - 30	р	p
30 - 40	15	p + 15
40 – 50	25	p + 40
50 - 60	20	p + 60
60 – 70	q	p + q + 60
70 – 80	8	p + q + 68
80 - 90	10	p + q + 78
_	90	

$$p + q + 78 = 90$$

$$p + q = 12$$

$$Median = (l) + \frac{2 - cf}{f}. h$$

$$50 = 50 + \frac{45 - (p + 40)}{20}. 10$$

$$\frac{45 - (p + 40)}{20}. 10 = 0$$

$$45 - (p + 40) = 0$$

$$P = 5$$

$$5 + q = 12$$

$$q = 7$$

$$f1 - f0$$

$$Mode = l + \frac{f1 - f0}{2f1 - f0 - f2}. h$$

1/2 1/2

1

1/2 1/2

1/2 1/2

1

$= 40 + \frac{25-15}{2(25)-15-20} \cdot 10$ $= 40 + \frac{100}{15} = 40 + 6.67 = 46.67$ SECTION E 36. (i) Number of throws during camp. $a = 40$; $d = 12$ $t_{11} = a + 10d$ $= 40 + 10 \times 12$ $= 160 throws$ (ii) $a = 7.56$ m; $d = 9$ cm $= 0.09$ m $n = 6$ weeks	1 1/2		
SECTION E 36. (i) Number of throws during camp. $a = 40$; $d = 12$ $t_{11} = a + 10d$ $= 40 + 10 \times 12$ $= 160 throws$ (ii) $a = 7.56$ m; $d = 9$ cm $= 0.09$ m	1/2		
36. (i) Number of throws during camp. $a = 40$; $d = 12$ $t_{11} = a + 10d$ $= 40 + 10 \times 12$ $= 160 throws$ (ii) $a = 7.56$ m; $d = 9$ cm $= 0.09$ m	1/2		
$t_{11} = a + 10d$ = $40 + 10 \times 12$ = 160 throws (ii) $a = 7.56 \text{ m}$; $d = 9 \text{cm} = 0.09 \text{ m}$	1/2		
$= 40 + 10 \times 12$ $= 160 throws$ (ii) a = 7.56 m; d = 9cm = 0.09 m			
= 160 throws (ii) a = 7.56 m; d = 9cm = 0.09 m			
(ii) a = 7.56 m; d = 9cm = 0.09 m			
n = 6 weeks	1/		
h = 0 + (m 1) d	1/2		
$t_n = a + (n-1) d$	1/2		
= 7.56 + 6(0.09) $= 7.56 + 0.54$	1/		
Sanjitha's throw distance at the end of 6 weeks = 8.1 m	1/2		
(or)			
a = 7.56 m; d = 9 cm = 0.09 m	1/2		
$t_n = 11.16 \text{ m}$	1/2		
$t_n = a + (n-1) d$	72		
11.16 = 7.56 + (n-1)(0.09)	1/2		
3.6 = (n-1)(0.09) 3.6			
$n-1 = \frac{3.6}{0.09} = 40$			
	1/2		
n = 41 So with a fact the second 11.16 we in 41 we also	/2		
Sanjitha's will be able to throw 11.16 m in 41 weeks.	_		
(iii) $a = 40$; $d = 12$; $n = 15$	1/		
$S_n = \frac{\pi}{2} [2a + (n-1) d]$	1/2		
$S = \begin{bmatrix} 15 \\ 12(40) + (15-1)(12) \end{bmatrix}$			
$\int_{0}^{\pi} \frac{-[2(\pi 0)^{\frac{1}{2}}(12)]}{2}$			
$=\frac{15}{100}[80+168]$			
15	1/2		
$S_{n} = \frac{\pi}{-[2a + (n-1) d]}$ $S_{n} = \frac{\frac{75}{-[2(40) + (15-1) (12)]}}{2[2(40) + (16-1) (12)]}$ $= \frac{\frac{15}{-[248]}}{2[248]} = 1860 \text{ throws}$	/2		
37. (i) Let D be (a,b), then			
Mid point of AC = Midpoint of BD			
$\left(\frac{1+6}{2}, \frac{2+6}{2}\right) = \left(\frac{4+a}{2}, \frac{3+b}{2}\right)$	1/2		
$\left(\frac{1}{2}, \frac{1}{2}\right) - \left(\frac{1}{2}, \frac{1}{2}\right)$			
4 + a = 7 $3 + b = 8$			
a = 3 b = 5			
Central midfielder is at (3,5)	1/2		

		1/
	(ii) GH = $\sqrt{(-3-3)^2 + (5-1)^2} = \sqrt{36+16} = \sqrt{52} = 2\sqrt{13}$	1/ ₂ 1/ ₂
	$GK = \sqrt{(0+3)^2 + (3-5)^2} = \sqrt{9+4} = \sqrt{13}$	1/2
	$HK = \sqrt{(3-0)^2 + (1-3)^2} = \sqrt{9+4} = \sqrt{13}$	1/2
	GK +HK = GH ⇒G,H & K lie on a same straight line	
	[or]	
	$CI = \sqrt{(0-5)^2 + (1+3)^2} = \sqrt{25+16} = \sqrt{41}$	1/2
	$CJ = \sqrt{(0-5)^2 + (1+3)^2} = \sqrt{25+16} = \sqrt{41}$ $CI = \sqrt{(0+4)^2 + (1-6)^2} = \sqrt{16+25} = \sqrt{41}$	1/2
	$CI = V(0 + 4)^2 + (1 - 0)^2 = V10 + 23 = V41$ Full-back $I(5 - 3)$ and contro-back $I(-4.6)$ are equidistant from forward $C(0.1)$	
	Full-back J(5,-3) and centre-back I(-4,6) are equidistant from forward C(0,1) Mid-point of IJ = $\begin{pmatrix} 5-4 \\ 2 \end{pmatrix}$, $\begin{pmatrix} -3+6 \\ 2 \end{pmatrix}$ = $\begin{pmatrix} 1 & 3 \\ 2 & 1 \end{pmatrix}$	1/2
	Mid-point of IJ = $\left(\frac{1}{2}, \frac{1}{2}\right) = \left(\frac{1}{2}, \frac{1}{2}\right)$	1/2
	C is NOT the mid-point of IJ	
	o to two t the mid point of the	
	(iii) A,B and E lie on the same straight line and B is equidistant from A and E	
	⇒ B is the mid-point of AE	
	$\left(\frac{1+a}{2}, \frac{4+b}{2}\right) = (2, -3)$	1/2
		1/2
	1 + a = 4; $a = 3$. $4+b = -6$; $b = -10$ E is (3,-10)	
38.	1 + a = 4; $a = 3$. $4+b = -6$; $b = -10$ E is (3,-10) (i) $\tan 45^{\circ} = \frac{80}{CB} \Rightarrow CB = 80$ m	1
	(ii) $\tan 30^\circ = \frac{80}{30^\circ}$	1/2
	$\frac{1}{1} \frac{\overline{CE}}{CE}$	1/2
	$\Rightarrow \frac{1}{-} = \frac{00}{-}$	1/2
	(ii) $\tan 30^\circ = \frac{80}{CE}$ $\Rightarrow \frac{1}{\sqrt{3}} = \frac{80}{CE}$	1/2
	\Rightarrow CE = $80\sqrt{3}$	
	Distance the bird flew = AD = BE = CE-CB = $80\sqrt{3}$ – $80 = 80(\sqrt{3}$ -1) m	
	Distance the bird new = $ND = DL = 0L \ 0D = 00 \ (VS = V)$ in	1/2
	(or)	1/2
	tan 60° =	
	$\tan 60^{\circ} = \frac{80}{CG}$	
	$\Rightarrow \sqrt{3} = \frac{80}{CG}$	1/2
		1/2
	\Rightarrow CG = $\frac{80}{\sqrt{3}}$	
	$\Rightarrow CG = \frac{1}{\sqrt{2}}$	
	Distance the ball travelled after hitting the tree =FA=GB = CB -CG	
	GB = 80 - $\frac{80}{\sqrt{3}}$ = 80 (1 - $\frac{1}{\sqrt{3}}$) m	
	$\frac{\sqrt{3}}{\sqrt{3}} = \sqrt{3} + \sqrt{3} + \sqrt{3}$	
	(iii) Speed of the bird = $\frac{Distance}{Time\ taken} = \frac{20(\sqrt{3}+1)}{2}$ m/sec	1/2
		1/2
	$= \frac{20(\sqrt{3}+1)}{2} \times 60 \text{ m/min} = 600(\sqrt{3}+1) \text{ m/min}$	72