	INDIAN SCHOOL MUSCAT HALF YEARLY EXAMINATION 2022 MATHEMATICS MARKING SCHEME CLASS: 10 SET A ,B ,C	MKS:80
	, ,	1,501,000
	1) a 2) a 3) c 4) a 5) b 6) d 7) a 8) c 9) d 10) d	1mk each
	11) F 12) F 13) T 14) F	1mk each
	15) +5 16) 45 17) 15/4 18) 154	1mk each
	19) d 20) b	1mk each
21	Assume that $2+5\sqrt{3}$ is a rational number. Therefore, we can write it in the form of $\frac{p}{q}$ where p and q are co-prime integers and $q \neq 0$. $2+5\sqrt{3} = \frac{p}{q}, q \neq 0$	<i>Y</i> ₂
	$5\sqrt{3} = \frac{p}{q} - 2$ $5\sqrt{3} = \frac{p - 2q}{q}$ $\sqrt{3} = \frac{p - 2q}{5q}$	1
	Here $\sqrt{3}$ is irrational and $\frac{p-2q}{5q}$ is rational because p and q are co-prime integers. But rational number cannot be equal to an irrational number. Hence $2+5\sqrt{3}$ is an irrational number. OR The required answer is the LCM of 9, 12, and 15 minutes.	1/2
	Finding prime factor of given number we have,	
	$9 = 3 \times 3 = 3^2$	1
	$12 = 2 \times 2 \times 3 = 2^2 \times 3$	
	$15 = 3 \times 5$ $LCM(9, 12, 15) = 2^{2} \times 3^{2} \times 5$	1/
		1/2
	= 150 minutes	
	The bells will toll next together after 180 minutes.	1/2
22	We have $2x - y = 2$ (1) x + 3y = 15(2)	
	From equation (1), we get $y = 2x - 2$ (3) Substituting the value of y in equation (2),	1/2
	Substituting the value of y in equation (2), x+6x-6=15	
	or, $7x = 21 \Rightarrow x = 3$	
	Substituting this value of x in (3), we get	1
	From equation (1), we have	1/
	$y = 2 \times 3 - 2 = 4$	1/2
	x = 3 and $y = 4$	
23	Sum of zeroes, $\alpha + \beta = 3$	
	Product of zeroes $\alpha\beta = -\frac{2}{5}$	
	Now $p(x) = x^2 - (\alpha + \beta)x + \alpha\beta$	
	$=x^2-3x-\frac{2}{5}$	1/2
		1
	$=\frac{1}{5}(5x^2-15x-2)$	1/2
	The required quadratic polynomial is $\frac{1}{5}(5x^2-15x-2)$	

24	We have $x^2 + kx + 12 = 0$	
	If 2 is the root of above equation, it must satisfy it.	
	$(2)^2 + 2k + 12 = 0$	
	, 2k + 16 = 0	
	k = -8	1
	Substituting $k = -8$ in $x^2 + kx + q = 0$ we have	
	$x^2 - 8x + q = 0$	1/2
	For equal roots,	
	$(-8)^2 - 4(1)q = 0$	
	64 - 4q = 0	1/2
	$4q = 64 \Rightarrow q = 16$	
	OR	
	We have $\sqrt{2} x^2 + 7x + 5\sqrt{2} = 0$	1/
	$\sqrt{2} x^2 + 2x + 5x + 5\sqrt{2} = 0$	½ ½
	$\sqrt{2}x(x+\sqrt{2})+5(x+\sqrt{2})=0$	/2
	$(x+\sqrt{2})(\sqrt{2}x+5) = 0$	
	Thus $x = -\sqrt{2}$ and $=-\frac{5}{\sqrt{2}}$	1/2 + 1/2
25	$\tan(3x+30^{\circ}) = 1 = \tan 45^{\circ}$	1
	$3x + 30^{\circ} = 45^{\circ}$	1/2
	$x = 5^{\circ}$	1/2
	$OA + OB + \widehat{ACB} = 31 \text{ cm}$ $6.5 + 6.5 + \widehat{ACB} = 31 \text{ cm}$	
	$\widehat{ACB} = 18 \text{cm}$	1/2
	Now, area of sector OACBO	
	$=\frac{1}{2} \times \text{radius} \times \widehat{ACB}$	1/2
	$=\frac{1}{2} \times 6.5 \times 18 = 58.5 \mathrm{cm}^2$	1/2 + 1/2
	OR	,2 , ,2
	Radius of circle $r = 10$ cm, central angle $= 90^{\circ}$	
	Area of minor segment, $= \frac{1}{2} \times 10^2 \times \left[\frac{3.14 \times 90}{180} - \sin 90^{\circ} \right]$	1/2 + 1/2
		1/2 + 1/2
27	$= \frac{1}{2} \times 100 \times [1.57 - 1] = 28.5 \text{ cm}^2$	/2 T /2
~ /	$\sqrt{3}\sin\theta - \cos\theta = 0 \text{ and } 0^{\circ} < \theta < 90^{\circ}$ $\sqrt{3}\sin\theta = \cos\theta$	1/2
		1/2
	$\frac{\sin\theta}{\cos\theta} = \frac{1}{\sqrt{3}}$	
	$\tan \theta = \frac{1}{\sqrt{3}} = \tan 30^{\circ} \left[\tan \theta = \frac{\sin \theta}{\cos \theta} \right]$	1/2
	$ heta=30^\circ$	1/2

20	We have, $\angle D = \angle E$	
28		
	and $\frac{AD}{DB} = \frac{AE}{EC}$	
	By converse of BPT, $DE \parallel BC$	1/2
	Due to corresponding angles we have	
	$\angle ADE = \angle ABC$ and	
	$\angle AED = \angle ACB$	
	Given $\angle ADE = \angle AED$	1/2
	Thus $\angle ABC = \angle ACB$	1/2
	Therefore BAC is an isosceles triangle.	1/2
29	W. I	/2
29	We have $404 = 2 \times 2 \times 101$ = $2^2 \times 101$	1/
	$= 2^{2} \times 101$ $96 = 2 \times 2 \times 2 \times 2 \times 2 \times 3$	1/2
	$96 = 2 \times 2 \times 2 \times 2 \times 2 \times 3$ $= 2^5 \times 3$	1/2
	$= 2^{\circ} \times 3$ HCF(404, 96) = $2^{\circ} = 4$	
	$LCM(404, 96) = 2^{-5} = 4$ $LCM(404, 96) = 101 \times 2^{5} \times 3 = 9696$	1/2
	$HCF \times LCM = 4 \times 9696 = 38784$	1/2
	Also, $404 \times 96 = 38784$	1/2
	Hence, $HCF \times LCM = Product \text{ of } 404 \text{ and } 96$	1/2
30		, -
30	$\frac{4}{x} - 3 = \frac{5}{2x + 3}$	
	4	1/
	$\frac{4}{x} - \frac{5}{2x+3} = 3$	1/2
	20,75	
	$\frac{4(2x+3)-5x}{x(2x+3)} = 3$	1/2
	$x(2x+3)$ – σ	
	8x + 12 - 5x = 3x(2x + 3)	
	$3x + 12 = 6x^2 + 9x$	1/2
	$6x^2 + 6x - 12 = 0$	/2
	$x^2 + x - 2 = 0$	
	$x^2 + 2x - x - 2 = 0$	1
	x(x+2) - (x+2) = 0	-
	(x+2)(x-1) = 0	
		1/ . 1/
	Thus $x = 1, -2$	1/2 + 1/2
	OR We have $x^2 + 6x - (a^2 + 2a - 8) = 0$	
	We have $x + 6x - (a + 2a - 8) = 0$ Comparing with $Ax^2 + Bx + C = 0$ we get	
	Comparing with $Ax + Bx + C = 0$ we get $A = 1, B = 6, C = (a^2 + 2a - 8)$	
	The roots are given by the quadratic formula	1/2
	$x = \frac{-B \pm \sqrt{B^2 - 4AC}}{2A}$	1/2
	$=rac{-6\pm\sqrt{36+4(a^2+2a-8)}}{2}$	
	$={2}$	
	$=\frac{-6\pm(2a+2)}{2}$	1/2
	$={2}$	
	Thus $x = \frac{-6 + (2a + 2)}{2} = a - 2$	1/2
	2	
	and $x = \frac{-6 - (2a + 2)}{2} = -a - 4$	1/2
	Thus $x = a - 2, -a - 4$	/2
	, =	

Squaring both sides, we have $ (\tan A + \cot A)^2 = (2)^2 $ $ \tan^2 A + \cot^2 A + 2 \tan A \cot A = 4 $ $ \tan^2 A + \cot^2 A + 2 \tan A \times \frac{1}{\tan A} = 4 $ $ \tan^2 A + \cot^2 A + 2 = 4 $ $ \tan^2 A + \cot^2 A = 2 $ $ \tan^2 A + \cot^2 A = 2 $ $ \times \tan^2 A + \cot^2 A = $	Squaring both sides, we have $ (\tan A + \cot A)^2 = (2)^2 $ $ \tan^2 A + \cot^2 A + 2 \tan A \cot A = 4 $ $ \tan^2 A + \cot^2 A + 2 \tan A \times \frac{1}{\tan A} = 4 $ $ \tan^2 A + \cot^2 A + 2 \cot A + 2 = 4 $ $ \tan^2 A + \cot^2 A = 2 $ $ \cot A + \cot A = 2 $ $ \cot A + \cot A + \cot A = 2 $ $ \cot A + \cot A + \cot A = 2 $ $ \cot A + \cot A + \cot A = 2 $ $ \cot A + \cot A + \cot A = 2 $ $ \cot A + \cot A + \cot A + \cot A = 2 $ $ \cot A + \cot A + \cot A + \cot A = 2 $ $ \cot A + \cot A + \cot A + \cot A = 2 $ $ \cot A + \cot A + \cot A + \cot A = 2 $ $ \cot A + \cot A + \cot A + \cot A = 2 $ $ \cot A + \cot A + \cot A + \cot A = 2 $ $ \cot A + \cot A + \cot A + \cot A = 2 $ $ \cot A + \cot A + \cot A + \cot A = 2 $ $ \cot A + \cot A + \cot A = 2 $ $ \cot A + \cot A + \cot A = 2 $ $ \cot A + \cot A + \cot A = 2 $ $ \cot A + \cot A + \cot A = 2 $ $ \cot A + \cot A + \cot A = 2 $ $ \cot A + \cot A + \cot A = 2 $ $ \cot A + \cot A + \cot A = 2 $ $ \cot A + \cot A + \cot A = 2 $ $ \cot A + \cot A + \cot A = 2 $ $ \cot A + \cot A + \cot A + \cot A = 2 $ $ \cot A + \cot $	24		_	1
$\tan A + \cot A^{2} = (2)^{2}$ $\tan^{2}A + \cot^{2}A + 2 \tan A \cot A = 4$ $\tan^{2}A + \cot^{2}A + 2 \tan A \cot A = 4$ $\tan^{2}A + \cot^{2}A + 2 \tan A = 4$ $\tan^{2}A + \cot^{2}A + 2 - 4 \cot A = 4$ $\tan^{2}A + \cot^{2}A + 2 - 4 \cot A = 4$ $\tan^{2}A + \cot^{2}A + 2 - 4 \cot A = 4$ $\tan^{2}A + \cot^{2}A + 2 - 4 \cot A = 4$ $\tan^{2}A + \cot^{2}A + 2 - 4 \cot A = 4$ $\cot^{2}A + \cot^{2}A + 2 - 4 \cot A = 4$ $\cot^{2}A + \cot^{2}A + 2 - 4 \cot A = 4$ $\cot^{2}A + \cot^{2}A - \cot^{2}A = 2$ OR LHS = $\frac{\cos A}{1 - \tan A} + \frac{\sin A}{1 - \cot A}$ $= \frac{\cos A}{\cos A} - \frac{1}{\sin A} - \frac{1}{(\cos A)}$ $= \frac{\cos^{2}A}{\cos A - \sin A} - \frac{\sin^{2}A}{\cos A - \sin A}$ $= \frac{\cos^{2}A}{\cos A - \sin A} - \frac{\sin^{2}A}{\cos A - \sin A}$ $= \frac{\cos^{2}A - \sin^{2}A}{\cos A - \sin A}$ $= \frac{\cos^{2}A - \sin^{2}A}{\cos A - \sin A}$ $= \frac{\cos^{2}A - \sin^{2}A}{\cos A - \sin A}$ $= \frac{\cos^{2}A + \sin^{2}A}{\cos A - \sin A}$ $= \frac{\cos^{2}A - \sin^{2}A}{\cos A - \sin A}$ $= \frac{\cos^{2}A + \sin^{2}A}{\cos A - \sin A}$ $= \frac{\cos^{2}A - \sin^{2}A}{\cos A - \sin A}$ $= \frac{\cos^{2}A - \sin^{2}A}{\cos A - \sin A}$ $= \cos A + \sin A$ $= \sin A + \cos A$ $= RHS$ Hence proved. 2 In $\triangle ABC$ and $\triangle ACD$ we have $\triangle ACB = \triangle CDA$ $\triangle ACB = \triangle ACD$ $ACB = \triangle ACD$ $ACCB = \triangle A$	$(\tan A + \cot A)^2 = (2)^2$ $\tan^2 A + \cot^2 A + 2 \tan A \cot A = 4$ $\tan^2 A + \cot^2 A + 2 \tan A = 4$ $\tan^2 A + \cot^2 A + 2 = 4$ $\tan^2 A + \cot^2 A = 2 = 4$ $\tan^2 A + \cot^2 A = 2$ $A = 2$ $A = \frac{\cos A}{1 - \tan A} + \frac{\sin A}{1 - \cot A}$ $= \frac{\cos A}{1 - (\frac{\cos A}{\cos A})} + \frac{\sin A}{1 - \cot A}$ $= \frac{\cos A}{\cos A - \sin A} + \frac{\sin A}{\sin A - \cos A}$ $= \frac{\cos^2 A}{\cos A - \sin A} - \frac{\sin^2 A}{\cos A - \sin A}$ $= \frac{\cos^2 A}{\cos A - \sin A} - \frac{\sin^2 A}{\cos A - \sin A}$ $= \frac{\cos^2 A - \sin^2 A}{\cos A - \sin A}$ $= \frac{\cos^2 A \sin A}{\cos A - \sin A}$ $= \frac{\cos A + \sin A}{\cos A - \sin A}$ $= \frac{\cos A + \sin A}{\cos A - \sin A}$ $= \frac{\cos A + \sin A}{\cos A - \sin A}$ $= \frac{\cos A + \sin A}{\cos A - \sin A}$ $= \frac{\cos A - \sin A \cos A + \sin A}{\cos A - \sin A}$ $= \frac{\cos A - \sin A \cos A + \sin A}{\cos A - \sin A}$ $= \frac{\cos A - \sin A \cos A + \sin A}{\cos A - \sin A}$ $= \frac{\cos A - \sin A \cos A + \sin A}{\cos A - \sin A}$ $= \frac{\cos A - \sin A \cos A + \sin A}{\cos A - \sin A}$ $= \frac{\cos A - \sin A \cos A + \sin A}{\cos A - \sin A}$ $= \frac{\cos A - \sin A \cos A + \sin A}{\cos A - \sin A}$ $= \frac{\cos A - \sin A \cos A + \sin A}{\cos A - \sin A}$ $= \frac{\cos A - \sin A \cos A + \sin A}{\cos A - \sin A}$ $= \frac{\cos A - \sin A \cos A + \sin A}{\cos A - \sin A}$ $= \frac{\cos A - \sin A \cos A + \sin A}{\cos A - \sin A}$ $= \frac{\cos A - \sin A \cos A + \sin A}{\cos A - \sin A}$ $= \frac{\cos A - \sin A \cos A + \sin A}{\cos A - \sin A}$ $= \frac{\cos A - \sin A \cos A + \sin A}{\cos A - \sin A}$ $= \frac{\cos A - \sin A \cos A + \sin A}{\cos A - \sin A}$ $= \cos A - \sin A \cos A$	31	We have $\tan A + \cot A = 2$		
$\tan^2 A + \cot^2 A + 2 \tan A \cot A = 4$ $\tan^2 A + \cot^2 A + 2 \tan A \times \frac{1}{\tan A} = 4$ $\tan^2 A + \cot^2 A + 2 \tan A \times \frac{1}{\tan A} = 4$ $\tan^2 A + \cot^2 A + 2 = 4$ $\tan^2 A + \cot^2 A = 2 = 4$ $a^2 A + \cot^2 A = 2 = 4$ $a^2 A + \cot^2 $	$\tan^2 A + \cot^2 A + 2 \tan A \cot A = 4$ $\tan^2 A + \cot^2 A + 2 \tan A \times \frac{1}{\tan A} = 4$ $\tan^2 A + \cot^2 A + 2 + 2 = 4$ $\tan^2 A + \cot^2 A = 2 = 4$ $\tan^2 A + \cot^2 A = 2$				
$\tan^2 A + \cot^2 A + 2 \tan A \times \frac{1}{\tan A} = 4$ $\tan^2 A + \cot^2 A + 2 = 4$ $\tan^2 A + \cot^2 A = 2 = 4$ $\tan^2 A + \cot^2 A = 2$ $\cot^2 A + \cot^2 A = 2$ OR $LHS = \frac{\cos A}{1 - \tan A} + \frac{\sin A}{1 - \cot A}$ $= \frac{\cos A}{\cos A - \sin A} + \frac{\sin A}{\sin A - \cos A}$ $= \frac{\cos^2 A}{\cos A - \sin A} + \frac{\sin^2 A}{\sin A - \cos A}$ $= \frac{\cos^2 A}{\cos A - \sin A} + \frac{\sin^2 A}{\sin A - \cos A}$ $= \frac{\cos^2 A - \sin^2 A}{\cos A - \sin A}$ $= \frac{\cos A - \sin A}{\cos A - \sin A}$ $= \frac{\cos A + \sin A}{\cos A - \sin A}$ $= \frac{\cos A + \sin A}{\cos A - \sin A}$ $= \frac{\cos A + \sin A}{\cos A - \sin A}$ $= \frac{\cot A + \sin A}{\cos A - \sin A}$ $= \frac{\cot A + \sin A}{\cos A - \sin A}$ $= \frac{\cot A + \sin A}{\cos A - \sin A}$ $= \frac{\cot A + \cot A}{\cos A - \sin A}$ $= \frac{\cot A + \cot A}{\cos A - \cot A}$ $= \frac{\cot A + \cot A}{\cos A - \cot A}$ $= \frac{\cot A + \cot A}{\cos A - \cot A}$ $= \frac{\cot A + \cot A}{\cos A - \cot A}$ $= \frac{\cot A + \cot A}{\cos A - \cot A}$ $= \frac{\cot A + \cot A}{\cos A - \cot A}$ $= \frac{\cot A + \cot A}{\cos A - \cot A}$ $= \frac{\cot A + \cot A}{\cos A - \cot A}$ $= \frac{\cot A + \cot A}{\cos A - \cot A}$ $= \frac{\cot A + \cot A}{\cos A - \cot A}$ $= \frac{\cot A + \cot A}{\cos A - \cot A}$ $= \frac{\cot A + \cot A}{\cos A - \cot A}$ $= \frac{\cot A + \cot A}{\cos A - \cot A}$ $= \frac{\cot A + \cot A}{\cos A - \cot A}$ $= \frac{\cot A + \cot A}{\cos A - \cot A}$ $= \frac{\cot A + \cot A}{\cos A - \cot A}$ $= \frac{\cot A + \cot A}{\cos A - \cot A}$ $= \frac{\cot A + \cot A}{\cos A - \cot A}$ $= \frac{\cot A + \cot A}{\cos A - \cot A}$ $= \frac{\cot A + \cot A}{\cot A}$ $= \frac{\cot A}{\cot A}$ $=$	$\tan^2 A + \cot^2 A + 2 \tan A \times \frac{1}{\tan A} = 4$ $\tan^2 A + \cot^2 A + 2 = 4$ $\tan^2 A + \cot^2 A + 2 = 4$ $\tan^2 A + \cot^2 A = 2$ $\cot^2 A + \cot^2 A = 2$ OR $LHS = \frac{\cos A}{1 - \tan A} + \frac{\sin A}{1 - \cot A}$ $= \frac{\cos A}{1 - (\frac{\cos A}{\sin A})} + \frac{\sin A}{1 - (\frac{\cos A}{\cos A})}$ $= \frac{\cos A}{\cos A} - \frac{\sin A}{\sin A} - \cos A$ $= \frac{\cos^2 A}{\cos A} - \frac{\sin^2 A}{\sin A} - \cos A$ $= \frac{\cos^2 A}{\cos A} - \sin^2 A$ $= \frac{\cos^2 A - \sin^2 A}{\cos A - \sin A}$ $= \frac{(\cos A - \sin A)(\cos A + \sin A)}{(\cos A - \sin A)}$ $= \frac{(\cos A + \sin A)(\cos A + \sin A)}{(\cos A - \sin A)}$ $= \cos A + \sin A$ $= \sin A + \cos A$ $= RIIS$ Hence proved. In $\triangle ABC$ and $\triangle ACD$ we have $\triangle ACB = \triangle CDA \qquad [\text{given}]$ $\triangle ABBC = \triangle CDA \qquad [\text{common}]$ By $\triangle A$ similarly criterion we get $\triangle ABBC = \triangle CDA \qquad [\text{common}]$ $\triangle ABBC = \triangle CDA \qquad [\text{common}]$ By $\triangle A$ similarly criterion we get $\triangle ABBC = \triangle CDA \qquad [\text{common}]$ $\triangle ABBC = \triangle CDA \qquad [\text{common}]$ By $\triangle A$ similarly criterion we get $\triangle ABBC = \triangle CDA \qquad [\text{common}]$ $\triangle ABBC = $		$(\tan A + \cot A)^2 = (2)^2$		
$\tan^A + \cot^A + 2 + \tan^A + \tan^A = 4$ $\tan^2 A + \cot^2 A + 2 = 4$ $\tan^2 A + \cot^2 A = 4 - 2$ $\tan^2 A + \cot^2 A = 2$ OR $LHS = \frac{\cos A}{1 - \tan A} + \frac{\sin A}{1 - \cot A}$ $= \frac{\cos A}{1 - (\frac{\sin A}{\cos A})} + \frac{\sin A}{1 - (\frac{\cos A}{\cos A})}$ $= \frac{\cos^2 A}{\cos A - \sin A} + \frac{\sin^2 A}{\sin A - \cos A}$ $= \frac{\cos^2 A}{\cos A - \sin A} - \frac{\sin^2 A}{\cos A - \sin A}$ $= \frac{\cos^2 A - \sin^2 A}{(\cos A - \sin A)}$ $= \frac{(\cos A - \sin A)(\cos A + \sin A)}{(\cos A - \sin A)}$ $= \cos A + \sin A$ $= \frac{(\cos A - \sin A)(\cos A + \sin A)}{(\cos A - \sin A)}$ $= \cos A + \sin A$ $= \sin A + \cos A$ $= \text{RHS}$ Hence proved. 2 In $\triangle ABC$ and $\triangle ACD$ we have $ABC - \triangle ACD$ $ABC - AACD$ $AC^2 - AB \times AD$ $AC^2 - A$	$\tan^2 A + \cot A + 2 \tan A = 4$ $\tan^2 A + \cot^2 A + 2 = 4$ $\tan^2 A + \cot^2 A + 2 = 4$ $\tan^2 A + \cot^2 A = 2$ $A = 4$ $\tan^2 A + \cot^2 A = 2$ $a^2 A + \cot^2 A = 2$ $a^2 A + \cot^2 A = 2$ $a^$		$\tan^2 A + \cot^2 A + 2\tan A \cot A = 4$		1/2
$\tan^2 A + \cot^2 A + 2 = 4$ $\tan^2 A + \cot^2 A = 4 - 2$ $\tan^2 A + \cot^2 A = 2$ OR $LHS = \frac{\cos A}{1 - \tan A} + \frac{\sin A}{1 - \cot A}$ $= \frac{\cos A}{\cos A - \sin A} + \frac{\sin A}{\sin A - \cos A}$ $= \frac{\cos^3 A}{\cos A - \sin A} - \frac{\sin^2 A}{\cos A - \sin A}$ $= \frac{\cos^2 A - \sin^2 A}{\cos A - \sin A}$ $= \frac{\cos^2 A - \sin^2 A}{\cos A - \sin A}$ $= \frac{(\cos A - \sin A)(\cos A + \sin A)}{(\cos A - \sin A)}$ $= \frac{(\cos A - \sin A)(\cos A + \sin A)}{(\cos A - \sin A)}$ $= \frac{(\cos A - \sin A)(\cos A + \sin A)}{(\cos A - \sin A)}$ $= \frac{1}{\cos A + \cos A} + \frac{1}{\sin A}$ $= \frac{1}{\sin A + \cos A}$ $= RHS$ Hence proved. 2 In $\triangle ABC$ and $\triangle ACD$ we have $\triangle ABC - \triangle ACD$ $\triangle ACC - \triangle ACD$ $\triangle ACC$	$\tan^2 A + \cot^2 A + 2 = 4$ $\tan^2 A + \cot^2 A = 4 - 2$ $\tan^2 A + \cot^2 A = 4 - 2$ $\tan^2 A + \cot^2 A = 2$ OR $LHS = \frac{\cos A}{1 - \tan A} + \frac{\sin A}{1 - \cot A}$ $= \frac{\cos^2 A}{1 - (\frac{\sin A}{\sin A})} + \frac{\sin^2 A}{1 - (\frac{\cos A}{\sin A})}$ $= \frac{\cos^2 A}{\cos A - \sin A} + \frac{\sin^2 A}{\sin A - \cos A}$ $= \frac{\cos^2 A}{\cos A - \sin A} - \frac{\sin^2 A}{\cos A - \sin A}$ $= \frac{\cos^2 A - \sin^2 A}{\cos A - \sin A}$ $= \frac{(\cos A + \sin A)(\cos A + \sin A)}{(\cos A - \sin A)}$ $= \cos A + \sin A$ $= \sin A + \cos A$ $= RHS$ Hence proved. In $\triangle ABC$ and $\triangle ACD$ we have $\angle ACB = \angle CDA \qquad [given]$ $\angle CAB = \angle CDA \qquad [given]$ $\angle CAB = \angle CDA \qquad [given]$ $ABC - \triangle ACD$ Thus $ABC - \triangle ACD$ $ACD = ACD$ $ACD = ACD$ Now $ABC - \triangle ACD$ Thus $ABC - \triangle ACD$ $ACD = ACD$ $ACD = ACD$ $ACC - $		$\tan^2 A + \cot^2 A + 2\tan A \times \frac{1}{1+1+1} = 4$		1/2
$\tan^2 A + \cot^2 A = 4 - 2$ $\tan^2 A + \cot^2 A = 2$ OR $LHS = \frac{\cos A}{1 - \tan A} + \frac{\sin A}{1 - \cot A}$ $= \frac{\cos A}{1 - \frac{\sin A}{(\cos A)}} + \frac{\sin A}{1 - \frac{\cos^2 A}{(\cos A)}}$ $= \frac{\cos^2 A}{\cos A - \sin A} + \frac{\sin^2 A}{\sin A - \cos A}$ $= \frac{\cos^2 A - \sin^2 A}{\cos A - \sin A} - \frac{\sin^2 A}{\cos A - \sin A}$ $= \frac{\cos^2 A - \sin A}{(\cos A - \sin A)}$ $= \frac{\cos^2 A - \sin A}{(\cos A - \sin A)}$ $= \frac{\cos^2 A - \sin A}{(\cos A - \sin A)}$ $= \frac{\cos A - \sin A}{(\cos A - \sin A)}$ $= \frac{\cos A - \sin A}{(\cos A - \sin A)}$ $= \frac{\cos A - \sin A}{(\cos A - \sin A)}$ $= \frac{\cos A - \sin A}{(\cos A - \sin A)}$ $= \frac{ABC}{(\cos A - \sin A$	$\tan^2 A + \cot^2 A = 4 - 2$ $\tan^2 A + \cot^2 A = 2$ OR $LHS = \frac{\cos A}{1 - \tan A} + \frac{\sin A}{1 - \cot A}$ $= \frac{\cos A}{1 - \frac{\sin A}{(\cos A)}} + \frac{\sin A}{1 - \frac{\cos A}{(\sin A)}}$ $= \frac{\cos^2 A}{\cos A - \sin A} + \frac{\sin^2 A}{\sin A - \cos A}$ $= \frac{\cos^2 A}{\cos A - \sin A} - \frac{\sin^2 A}{\cos A - \sin A}$ $= \frac{\cos^2 A - \sin^2 A}{\cos A - \sin A}$ $= \frac{\cos A + \sin A}{(\cos A - \sin A)}$ $= \frac{\cos A + \sin A}{(\cos A - \sin A)}$ $= \frac{\cos A + \sin A}{(\cos A - \sin A)}$ $= \frac{\cot A + \cot A}{(\cos A - \sin A)}$ $= \frac{\cot A + \cot A}{(\cos A - \sin A)}$ $= \frac{\cot A + \cot A}{(\cos A - \sin A)}$ $= \frac{\cot A + \cot A}{(\cos A - \sin A)}$ $= \frac{\cot A + \cot A}{(\cos A - \sin A)}$ $= \frac{\cot A + \cot A}{(\cos A - \sin A)}$ $= \frac{\cot A + \cot A}{(\cos A - \sin A)}$ $= \frac{\cot A + \cot A}{(\cos A - \sin A)}$ $= \frac{\cot A + \cot A}{(\cos A - \sin A)}$ $= \frac{\cot A + \cot A}{(\cos A - \sin A)}$ $= \frac{\cot A + \cot A}{(\cos A - \sin A)}$ $= \frac{\cot A + \cot A}{(\cos A - \sin A)}$ $= \frac{\cot A + \cot A}{(\cos A - \sin A)}$ $= \frac{\cot A + \cot A}{(\cos A - \sin A)}$ $= \frac{\cot A + \cot A}{(\cos A - \sin A)}$ $= \frac{\cot A + \cot A}{(\cos A - \sin A)}$ $= \frac{\cot A + \cot A}{(\cos A - \sin A)}$ $= \frac{\cot A + \cot A}{(\cos A - \cos A)}$ $= \frac$		***************************************		
$\tan^2 A + \cot^2 A = 2$ OR $LHS = \frac{\cos A}{1 - \tan A} + \frac{\sin A}{1 - \cot A}$ $= \frac{\cos A}{1 - (\frac{\sin A}{\cos A})} + \frac{\sin A}{1 - (\frac{\cos A}{\sin A})}$ $= \frac{\cos^2 A}{\cos A} - \frac{\sin A}{\sin A - \cos A}$ $= \frac{\cos^2 A - \sin A}{\cos A - \sin A} - \frac{\sin^2 A}{\cos A - \sin A}$ $= \frac{\cos^2 A - \sin^2 A}{\cos A - \sin A}$ $= \frac{(\cos A - \sin A)(\cos A + \sin A)}{(\cos A - \sin A)}$ $= \cos A + \sin A$ $= \sin A + \cos A$ $= RHS \qquad \text{Hence proved.}$ 2 In $\triangle ABC$ and $\triangle ACD$ we have $\angle ACB = \angle CDA \qquad \text{[given]}$ $\angle CAB = \angle CAD \qquad \text{[common]}$ By AA similarity criterion we get $\triangle ABC \sim \triangle ACD$ Thus $\frac{AB}{AC} = \frac{BC}{AD}$ Now $\frac{AB}{AC} = \frac{AC}{AD}$ $AC^2 = AB \times AD$ $6^2 = AB \times 3$ $AB = \frac{36}{3} = 12 \text{ cm}$ Again, let PQ be height of pole and QR be its shad the same time, the angle of elevation of tree and pole equal i.e. $\triangle ABC \sim PQR$	OR $LHS = \frac{\cos A}{1 - \tan A} + \frac{\sin A}{1 - \cot A}$ $= \frac{\cos A}{1 - (\frac{\sin A}{\cos A})} + \frac{\sin A}{1 - (\frac{\cos A}{\sin A})}$ $= \frac{\cos^2 A}{\cos A} + \frac{\sin A}{\sin A - \cos A}$ $= \frac{\cos^2 A - \sin A}{\cos A - \sin A} + \frac{\sin^2 A}{\cos A - \sin A}$ $= \frac{\cos^2 A - \sin^2 A}{\cos A - \sin A}$ $= \frac{\cos^2 A - \sin^2 A}{\cos A - \sin A}$ $= \frac{\cos^2 A - \sin^2 A}{\cos A - \sin A}$ $= \frac{\cos^2 A - \sin^2 A}{\cos A - \sin A}$ $= \frac{\cos A + \sin A}{(\cos A - \sin A)}$ $= \cos A + \sin A$ $= \sin A + \cos A$ $= \text{RIB}$ Ilence proved. In $\triangle ABC$ and $\triangle ACD$ we have $\triangle ACB = \triangle CDA \qquad [\text{given}]$ $\triangle CAB = \triangle CAD \qquad [\text{common}]$ By AA similarity criterion we get $\triangle ABC \sim \triangle ACD$ Thus $\frac{AB}{AC} = \frac{AC}{CD} = \frac{AC}{AD}$ Now $\frac{AB}{AC} = \frac{AC}{AD}$ $AC^2 = AB \times AD$ $6^2 = AB \times 3$ $AB = \frac{36}{3} = 12 \text{ cm}$ Again, let PQ be height of pole and QR be its shad the same time, the angle of elevation of tree and pole equal i.e. $\triangle ABC \sim PQR$				1/2
OR LHS = $\frac{\cos A}{1 - \tan A} + \frac{\sin A}{1 - \cot A}$ = $\frac{\cos A}{1 - (\frac{\sin A}{\cos A})} + \frac{\sin A}{1 - (\frac{\cos A}{\cos A})}$ = $\frac{\cos^2 A}{\cos A - \sin A} + \frac{\sin^2 A}{\cos A - \cos A}$ = $\frac{\cos^2 A}{\cos A - \sin A} - \frac{\sin^2 A}{\cos A - \sin A}$ = $\frac{\cos^2 A - \sin^2 A}{\cos A - \sin A}$ = $\frac{\cos^2 A - \sin^2 A}{\cos A - \sin A}$ = $\frac{\cos^2 A - \sin^2 A}{\cos A - \sin A}$ = $\frac{\cos^2 A - \sin^2 A}{\cos A - \sin A}$ = $\frac{\cos^2 A - \sin^2 A}{\cos A - \sin A}$ = $\frac{\cos^2 A - \sin^2 A}{\cos A - \sin A}$ = $\frac{\cos^2 A - \sin^2 A}{\cos A - \sin A}$ = $\frac{\cos^2 A - \sin^2 A}{\cos A - \sin A}$ = $\frac{\cos^2 A - \sin^2 A}{\cos A - \sin A}$ = $\frac{\cos^2 A - \sin^2 A}{\cos A - \sin A}$ $\frac{\cos^2 A - \sin^2 A}{\cos A - \sin A}$ $\frac{\cos^2 A - \sin^2 A}{\cos A - \sin A}$ $\frac{\cos^2 A - \sin^2 A}{\cos A - \sin A}$ $\frac{\cos^2 A - \sin^2 A}{\cos A - \sin^2 A}$ $\frac{\cos^2 A - \sin^2 A}{\cos A - \sin^2 A}$ $\frac{\cos^2 A - \sin^2 A}{\cos A - \sin^2 A}$ $\frac{\cos^2 A - \sin^2 A}{\cos A - \sin^2 A}$ $\frac{\cos^2 A - \sin^2 A}{\cos A - \sin^2 A}$ $\frac{\cos^2 A - \sin^2 A}{\cos A - \sin^2 A}$ $\frac{\cos^2 A - \sin^2 A}{\cos A - \sin^2 A}$ $\frac{\cos^2 A - \sin^2 A}{\cos A - \sin^2 A}$ $\frac{\cos^2 A - \sin^2 A}{\cos^2 A - \sin^2 A}$ $\frac{\cos^2 A - \cos^2 A}{\cos^2 A - \sin^2 A}$ $\frac{\cos^2 A - \cos^2 A}{\cos^2 A - \cos^2 A}$ $\frac{\cos^2 A - \cos^2 A}{\cos^2 A - \cos^2 A}$ $\frac{\cos^2 A - \cos^2 A}{\cos^2 A - \cos^2$	OR $LHS = \frac{\cos A}{1 - \tan A} + \frac{\sin A}{1 - \cot A}$ $= \frac{\cos A}{1 - (\frac{\sin A}{\cos A})} + \frac{\sin A}{1 - (\frac{\cos A}{\cos A})}$ $= \frac{\cos^2 A}{\cos A - \sin A} + \frac{\sin^2 A}{\sin A - \cos A}$ $= \frac{\cos^2 A}{\cos A - \sin A} - \frac{\sin^2 A}{\cos A - \sin A}$ $= \frac{\cos^2 A - \sin^2 A}{\cos A - \sin A}$ $= \frac{\cos^2 A - \sin^2 A}{\cos A - \sin A}$ $= \frac{\cos^2 A - \sin^2 A}{\cos A - \sin A}$ $= \frac{\cos^2 A - \sin^2 A}{\cos A - \sin A}$ $= \frac{\cos^2 A - \sin^2 A}{\cos A - \sin A}$ $= \cos A + \sin A$ $= \sin A + \cos A$ $= RIIS$ Hence proved. In $\triangle ABC$ and $\triangle ACD$ we have $\triangle ACB = \triangle CDA \qquad [given]$ $\triangle CAB = \triangle CDA \qquad [a]$ $\triangle CAB = \triangle CDA \qquad [a]$ $\triangle CAB = \triangle CDA \qquad [b]$ $\triangle CBB $				1/2
LHS = $\frac{\cos A}{1 - \tan A} + \frac{\sin A}{1 - \cot A}$ = $\frac{\cos A}{1 - \frac{\cos A}{(\cos A)}} + \frac{\sin A}{1 - \frac{\cos A}{(\cos A)}}$ = $\frac{\cos A}{\cos A - \sin A} + \frac{\sin A}{\sin A - \cos A}$ = $\frac{\cos^2 A}{\cos A - \sin A} - \frac{\sin^2 A}{\cos A - \sin A}$ = $\frac{\cos^2 A - \sin^2 A}{(\cos A - \sin A)}$ = $\frac{\cos^2 A - \sin^2 A}{(\cos A - \sin A)}$ = $\frac{\cos^2 A - \sin^2 A}{(\cos A - \sin A)}$ = $\frac{\cos A + \sin A}{(\cos A - \sin A)}$ = $\cos A + \sin A$ = $\sin A + \cos A$ = RHS Hence proved. 2 In ΔABC and ΔACD we have $ACB = ACD$ $ACB = ACD$ $AABC - \Delta ACD$ Thus $ABC - \Delta ACD$ $AABC - \Delta ACD$ Thus $ABC - \Delta ACD$ $AABC - \Delta ACD$ Thus $ABC - \Delta ACD$ $ACC = ACC$ ACC	LHS = $\frac{\cos A}{1 - \tan A} + \frac{\sin A}{1 - \cot A}$ = $\frac{\cos A}{1 - \frac{\sin A}{(\cos A)}} + \frac{\sin A}{1 - \frac{\cos A}{(\cos A)}}$ = $\frac{\cos^2 A}{\cos A - \sin A} + \frac{\sin^2 A}{\sin A - \cos A}$ = $\frac{\cos^2 A}{\cos A - \sin A} - \frac{\sin^2 A}{\cos A - \sin A}$ = $\frac{\cos^2 A - \sin^2 A}{(\cos A - \sin A)}$ = $\frac{\cos^2 A - \sin^2 A}{(\cos A - \sin A)}$ = $\frac{\cos^2 A - \sin^2 A}{(\cos A - \sin A)}$ = $\frac{\cos A + \sin A}{(\cos A - \sin A)}$ = $\cos A + \sin A$ = $\sin A + \cos A$ = RHS Hence proved. In $\triangle ABC$ and $\triangle ACD$ we have $\triangle ACD = \triangle CDA$ $\triangle CAB = \triangle CDA$ Thus $\frac{AB}{AC} = \frac{AC}{AD}$ $AABC - AACD$ Now $\frac{AB}{AC} = \frac{AC}{AD}$ $ACC = AB \times AD$ Again, let PQ be height of pole and QR be its shad the same time, the angle of elevation of tree and pequal i.e. $\triangle ABC \sim PQR$				1/2
$= \frac{\cos A}{1 - (\frac{\sin A}{\sin A})} + \frac{\sin A}{1 - (\frac{\cos A}{\sin A})}$ $= \frac{\cos^2 A}{\cos A - \sin A} + \frac{\sin^2 A}{\sin A - \cos A}$ $= \frac{\cos^2 A}{\cos A - \sin A} - \frac{\sin^2 A}{\cos A - \sin A}$ $= \frac{\cos^2 A - \sin^2 A}{\cos A - \sin A}$ $= \frac{\cos^2 A - \sin^2 A}{(\cos A - \sin A)}$ $= \frac{(\cos A - \sin A)(\cos A + \sin A)}{(\cos A - \sin A)}$ $= \cos A + \sin A$ $= \sin A + \cos A$ $= RHS$ Hence proved. 2 In $\triangle ABC$ and $\triangle ACD$ we have $\triangle ACB = \triangle CDA \qquad [given]$ $\triangle CAB = \triangle CDA \qquad [common]$ By AA similarity criterion we get $\triangle ABC \sim \triangle ACD$ Thus $ABC \sim \triangle ACD$ $ACB = ACD$ Now $ABC \sim \triangle ACD$ $ACB = ACD$ $ACD = ACD$	$= \frac{\cos A}{1 - (\frac{\sin A}{\cos A})} + \frac{\sin A}{1 - (\frac{\cos A}{\cos A})}$ $= \frac{\cos^2 A}{\cos A - \sin A} + \frac{\sin^2 A}{\sin A - \cos A}$ $= \frac{\cos^2 A}{\cos A - \sin A} - \frac{\sin^2 A}{\cos A - \sin A}$ $= \frac{\cos^2 A - \sin^2 A}{\cos A - \sin A}$ $= \frac{(\cos A - \sin A)(\cos A + \sin A)}{(\cos A - \sin A)}$ $= \cos A + \sin A$ $= \sin A + \cos A$ $= RIBS \qquad \text{Hence proved.}$ In $\triangle ABC$ and $\triangle ACD$ we have $\triangle ACB = \triangle CDA \qquad \text{[given]}$ $\triangle CAB = \triangle CAD \qquad \text{[common]}$ By AA similarity criterion we get $\triangle ABC \sim \triangle ACD$ Thus $AB = \frac{BC}{AC} = \frac{AC}{AD}$ Now $AB = \frac{AC}{AC} = \frac{AC}{AD}$ $AC = AB \times AD$ $6^2 = AB \times 3$ $AB = \frac{36}{3} = 12 \text{ cm}$ Again, let PQ be height of pole and QR be its shad the same time, the angle of elevation of tree and pequal i.e. $\triangle ABC \sim PQR$		OR		
$=\frac{\cos^2 A}{\cos A - \sin A} + \frac{\sin^2 A}{\sin A - \cos A}$ $=\frac{\cos^2 A}{\cos A - \sin A} - \frac{\sin^2 A}{\cos A - \sin A}$ $=\frac{\cos^2 A - \sin^2 A}{\cos A - \sin A}$ $=\frac{(\cos A - \sin A)(\cos A + \sin A)}{(\cos A - \sin A)}$ $= \cos A + \sin A$ $= \sin A + \cos A$ $= RHS \qquad \text{Hence proved.}$ In $\triangle ABC$ and $\triangle ACD$ we have $\angle ACB = \angle CDA$ $\angle CAB = \angle CAD$ $By AA similarity criterion we get \triangle ABC - \triangle ACD Thus \qquad \frac{AB}{AC} = \frac{BC}{AC} AC = AD Now \frac{AB}{AC} = \frac{AC}{AD} AC' = AB \times AD 6^2 = AB \times 3 AB = \frac{36}{3} = 12 \text{ cm} Again, let PQ be height of pole and QR be its shad the same time, the angle of elevation of tree and pole equal i.e \triangle ABC \sim PQR$	$=\frac{\cos^2 A}{\cos A - \sin A} + \frac{\sin^2 A}{\sin A - \cos A}$ $=\frac{\cos^2 A}{\cos A - \sin A} - \frac{\sin^2 A}{\cos A - \sin A}$ $=\frac{\cos^2 A - \sin^2 A}{\cos A - \sin A}$ $=\frac{(\cos A - \sin A)(\cos A + \sin A)}{(\cos A - \sin A)}$ $= \cos A + \sin A$ $= \sin A + \cos A$ $= RHS$ Hence proved. In $\triangle ABC$ and $\triangle ACD$ we have $\triangle ACB = \triangle CDA$ $\triangle CAB = \triangle CDA$ $\triangle CAB = \triangle CAD$ By AA similarity criterion we get $\triangle ABC \sim \triangle ACD$ Thus $\frac{AB}{AC} = \frac{BC}{AC} = \frac{AC}{AD}$ Now $\frac{AB}{AC} = \frac{AC}{AC}$ $AC^2 = AB \times AD$ $6^2 = AB \times 3$ $AB = \frac{36}{3} = 12 \text{ cm}$ Again, let PQ be height of pole and QR be its shad the same time, the angle of elevation of tree and poly equal i.e. $\triangle ABC \sim PQR$		LHS = $\frac{\cos A}{1 - \tan A} + \frac{\sin A}{1 - \cot A}$		
$=\frac{\cos^2 A}{\cos A - \sin A} + \frac{\sin^2 A}{\sin A - \cos A}$ $=\frac{\cos^2 A}{\cos A - \sin A} - \frac{\sin^2 A}{\cos A - \sin A}$ $=\frac{\cos^2 A - \sin^2 A}{\cos A - \sin A}$ $=\frac{(\cos A - \sin A)(\cos A + \sin A)}{(\cos A - \sin A)}$ $= \cos A + \sin A$ $= \sin A + \cos A$ $= RHS \qquad \text{Hence proved.}$ In $\triangle ABC$ and $\triangle ACD$ we have $\angle ACB = \angle CDA$ $\angle CAB = \angle CAD$ $By AA similarity criterion we get \triangle ABC - \triangle ACD Thus \qquad \frac{AB}{AC} = \frac{BC}{AC} AC = AD Now \frac{AB}{AC} = \frac{AC}{AD} AC' = AB \times AD 6^2 = AB \times 3 AB = \frac{36}{3} = 12 \text{ cm} Again, let PQ be height of pole and QR be its shad the same time, the angle of elevation of tree and pole equal i.e \triangle ABC \sim PQR$	$=\frac{\cos^2 A}{\cos A - \sin A} + \frac{\sin^2 A}{\sin A - \cos A}$ $=\frac{\cos^2 A}{\cos A - \sin A} - \frac{\sin^2 A}{\cos A - \sin A}$ $=\frac{\cos^2 A - \sin^2 A}{\cos A - \sin A}$ $=\frac{(\cos A - \sin A)(\cos A + \sin A)}{(\cos A - \sin A)}$ $= \cos A + \sin A$ $= \sin A + \cos A$ $= RHS$ Hence proved. In $\triangle ABC$ and $\triangle ACD$ we have $\triangle ACB = \triangle CDA$ $\triangle CAB = \triangle CDA$ $\triangle CAB = \triangle CAD$ By AA similarity criterion we get $\triangle ABC \sim \triangle ACD$ Thus $\frac{AB}{AC} = \frac{BC}{AC} = \frac{AC}{AD}$ Now $\frac{AB}{AC} = \frac{AC}{AC}$ $AC^2 = AB \times AD$ $6^2 = AB \times 3$ $AB = \frac{36}{3} = 12 \text{ cm}$ Again, let PQ be height of pole and QR be its shad the same time, the angle of elevation of tree and poly equal i.e. $\triangle ABC \sim PQR$		$= \frac{\cos A}{1 - \left(\frac{\sin A}{\cos A}\right)} + \frac{\sin A}{1 - \left(\frac{\cos A}{\sin A}\right)}$		1/2
$= \frac{\cos^2 A}{\cos A - \sin A} - \frac{\sin^2 A}{\cos A - \sin A}$ $= \frac{\cos^2 A - \sin^2 A}{\cos A - \sin A}$ $= \frac{(\cos A - \sin A)(\cos A + \sin A)}{(\cos A - \sin A)}$ $= \cos A + \sin A$ $= \sin A + \cos A$ $= RHS$ Hence proved. 2 In $\triangle ABC$ and $\triangle ACD$ we have $\angle ACB = \angle CDA$ $\angle CAB = \angle CAD$ $ABC - \triangle ACD$ By AA similarity criterion we get $\triangle ABC - \triangle ACD$ Thus $\frac{AB}{AC} = \frac{BC}{CD} = \frac{AC}{AD}$ Now $\frac{AB}{AC} = \frac{AC}{AD}$ $AC^2 = AB \times AD$ $A^2 = AB \times AD$ $A^2 = AB \times AD$ Again, let PQ be height of pole and QR be its shad the same time, the angle of elevation of tree and pole equal i.e $\triangle ABC \sim PQR$	$=\frac{\cos^2 A}{\cos A - \sin A} - \frac{\sin^2 A}{\cos A - \sin A}$ $=\frac{\cos^2 A - \sin^2 A}{\cos A - \sin A}$ $=\frac{(\cos A - \sin A)(\cos A + \sin A)}{(\cos A + \sin A)}$ $= \cos A + \sin A$ $= \sin A + \cos A$ $= \text{RHS} \qquad \text{Hence proved.}$ In $\triangle ABC$ and $\triangle ACD$ we have $\angle ACB = \angle CDA \qquad \text{[given]}$ $\angle CAB = \angle CAD \qquad \text{[common]}$ By AA similarity criterion we get $\triangle ABC - \triangle ACD$ Thus $\frac{AB}{AC} = \frac{BC}{AD} = \frac{AC}{AD}$ Now $\frac{AB}{AC} = \frac{AC}{AD}$ $AC^2 = AB \times AD$ $6^2 = AB \times 3$ $AB = \frac{36}{3} = 12 \text{ cm}$ Again, let PQ be height of pole and QR be its shad the same time, the angle of elevation of tree and pole equal i.e $\triangle ABC \sim PQR$				
$=\frac{\cos^2 A - \sin^2 A}{\cos A - \sin A}$ $=\frac{(\cos A - \sin A)(\cos A + \sin A)}{(\cos A - \sin A)}$ $=\cos A + \sin A$ $=\sin A + \cos A$ $= RHS \qquad \text{Hence proved.}$ In $\triangle ABC$ and $\triangle ACD$ we have $\angle ACB = \angle CDA \qquad \text{[given]}$ $\angle CAB = \angle CAD \qquad \text{[common]}$ By AA similarity criterion we get $\triangle ABC \sim \Delta ACD$ Thus $\frac{AB}{AC} = \frac{BC}{AD}$ Now $\frac{AB}{AC} = \frac{AC}{AD}$ $AC' = AB \times AD$ $AB = \frac{36}{3} = 12 \text{ cm}$ In $\triangle ABC \sim AB$	$=\frac{\cos^2 A - \sin^2 A}{\cos A - \sin A}$ $=\frac{(\cos A - \sin A)(\cos A + \sin A)}{(\cos A - \sin A)}$ $= \cos A + \sin A$ $= \sin A + \cos A$ $= \text{RHS} \qquad \text{Hence proved.}$ In $\triangle ABC$ and $\triangle ACD$ we have $\angle ACB = \angle CDA \qquad \text{[given]}$ $\angle CAB = \angle CAB \qquad \text{[common]}$ By AA similarity criterion we get $\triangle ABC \sim AACD$ Thus $\frac{AB}{AC} = \frac{BC}{AD}$ Now $\frac{AB}{AC} = \frac{AC}{AD}$ $AC^3 = AB \times AD$ $6^2 = AB \times 3$ $AB = \frac{36}{3} = 12 \text{ cm}$ Again, let PQ be height of pole and QR be its shad the same time, the angle of elevation of tree and pole equal i.e $\triangle ABC \sim PQR$				
$= \frac{(\cos A - \sin A)(\cos A + \sin A)}{(\cos A - \sin A)}$ $= \cos A + \sin A$ $= \sin A + \cos A$ $= \text{RHS} \qquad \text{Hence proved.}$ In $\triangle ABC$ and $\triangle ACD$ we have $\triangle ACB = \triangle CDA \qquad \text{[given]}$ $\triangle CAB = \triangle CAD \qquad \text{[common]}$ By AA similarity criterion we get $\triangle ABC \sim \triangle ACD$ Thus $\frac{AB}{AC} = \frac{BC}{CD} = \frac{AC}{AD}$ Now $\frac{AB}{AC} = \frac{AC}{AD}$ $AC^{\theta} = AB \times AD$ $6^{2} = AB \times 3$ $AB = \frac{36}{3} = 12 \text{ cm}$ In $\triangle ABC \sim \triangle ACD$ $\triangle ABC \sim \triangle ACD \qquad \text{[common]}$ $\triangle ABC \sim \triangle ACD \qquad \text{[given]}$ $\triangle ABC \sim \triangle ACD \qquad \text{[common]}$	$=\frac{(\cos A - \sin A)(\cos A + \sin A)}{(\cos A - \sin A)}$ $= \cos A + \sin A$ $= \sin A + \cos A$ $= \text{RHS} \qquad \text{Hence proved.}$ In $\triangle ABC$ and $\triangle ACD$ we have $\angle ACB = \angle CDA \qquad \text{[given]}$ $\angle CAB = \angle CAD \qquad \text{[common]}$ By AA similarity criterion we get $\triangle ABC \sim \triangle ACD$ Thus $\frac{AB}{AC} = \frac{BC}{CD} = \frac{AC}{AD}$ Now $\frac{AB}{AC} = \frac{AC}{AD}$ $AC^{\theta} = AB \times AD$ $6^2 = AB \times 3$ $AB = \frac{36}{3} = 12 \text{ cm}$ Again, let PQ be height of pole and QR be its shad the same time, the angle of elevation of tree and pole equal i.e $\triangle ABC \sim PQR$		$= \frac{\cos^2 A}{\cos A - \sin A} - \frac{\sin^2 A}{\cos A - \sin A}$		1/2
$= \cos A + \sin A$ $= \sin A + \cos A$ $= \text{RHS} \qquad \text{Hence proved.}$ 2 In $\triangle ABC$ and $\triangle ACD$ we have	$= \cos A + \sin A$ $= \sin A + \cos A$ $= \text{RHS} \qquad \text{Hence proved.}$ In $\triangle ABC$ and $\triangle ACD$ we have $ \angle ACB = \angle CDA \qquad \text{[given]} $ $ \angle CAB = \angle CAD \qquad \text{[common]} $ By AA similarity criterion we get $ \triangle ABC \sim \triangle ACD $ Thus $ \frac{AB}{AC} = \frac{BC}{CD} = \frac{AC}{AD} $ Now $ \frac{AB}{AC} = \frac{AC}{AD} $ $ AC' = AB \times AD $ $ 6^2 = AB \times 3$ $ AB = \frac{36}{3} = 12 \text{ cm}$ Again, let PQ be height of pole and QR be its shad the same time, the angle of elevation of tree and pole equal i.e $\triangle ABC \sim PQR$		$=\frac{\cos^2 A - \sin^2 A}{\cos A - \sin A}$		1/2
$= \cos A + \sin A$ $= \sin A + \cos A$ $= \text{RHS} \qquad \text{Hence proved.}$ 2 In $\triangle ABC$ and $\triangle ACD$ we have	$= \cos A + \sin A$ $= \sin A + \cos A$ $= \text{RHS} \qquad \text{Hence proved.}$ In $\triangle ABC$ and $\triangle ACD$ we have $ \angle ACB = \angle CDA \qquad \text{[given]} $ $ \angle CAB = \angle CAD \qquad \text{[common]} $ By AA similarity criterion we get $ \triangle ABC \sim \triangle ACD $ Thus $ \frac{AB}{AC} = \frac{BC}{CD} = \frac{AC}{AD} $ Now $ \frac{AB}{AC} = \frac{AC}{AD} $ $ AC' = AB \times AD $ $ 6^2 = AB \times 3$ $ AB = \frac{36}{3} = 12 \text{ cm}$ Again, let PQ be height of pole and QR be its shad the same time, the angle of elevation of tree and pole equal i.e $\triangle ABC \sim PQR$		$=\frac{(\cos A - \sin A)(\cos A + \sin A)}{(\cos A + \sin A)}$		1/2
$= \sin A + \cos A$ $= \text{RHS} \qquad \text{Hence proved.}$ In $\triangle ABC$ and $\triangle ACD$ we have $ \angle ACB = \angle CDA \qquad \text{[given]} $ $ \angle CAB = \angle CAD \qquad \text{[common]} $ By AA similarity criterion we get $ \triangle ABC \sim \triangle ACD$ Thus $ \frac{AB}{AC} = \frac{BC}{AD} = \frac{AC}{AD}$ Now $ \frac{AB}{AC} = \frac{AC}{AD}$ $ AC^{\varrho} = AB \times AD$ $ 6^{\varrho} = AB \times 3$ $ AB = \frac{36}{3} = 12 \text{ cm}$ Again, let PQ be height of pole and QR be its shad the same time, the angle of elevation of tree and pole equal i.e $\triangle ABC \sim PQR$	$= \sin A + \cos A$ $= \text{RHS} \qquad \text{Hence proved.}$ In $\triangle ABC$ and $\triangle ACD$ we have $ \angle ACB = \angle CDA \qquad \text{[given]} $ $ \angle CAB = \angle CAD \qquad \text{[common]} $ By AA similarity criterion we get $ \triangle ABC \sim \triangle ACD$ Thus $ \frac{AB}{AC} = \frac{BC}{CD} = \frac{AC}{AD}$ Now $ \frac{AB}{AC} = \frac{AC}{AD}$ $ AC^{\theta} = AB \times AD$ $ 6^{2} = AB \times 3$ $ AB = \frac{36}{3} = 12 \text{ cm}$ Again, let PQ be height of pole and QR be its shad the same time, the angle of elevation of tree and pole equal i.e $\triangle ABC \sim PQR$				
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	$= \text{RHS} \qquad \text{Hence proved.}$ In $\triangle ABC$ and $\triangle ACD$ we have $ \angle ACB = \angle CDA \qquad \text{[given]} $ $ \angle CAB = \angle CAD \qquad \text{[common]} $ By AA similarity criterion we get $ \triangle ABC \sim \triangle ACD$ Thus $ \frac{AB}{AC} = \frac{BC}{AD} = \frac{AC}{AD}$ Now $ \frac{AB}{AC} = \frac{AC}{AD}$ $ AC^c = AB \times AD$ $ 6^2 = AB \times 3$ $ AB = \frac{36}{3} = 12 \text{ cm}$ Again, let PQ be height of pole and QR be its shad the same time, the angle of elevation of tree and pole equal i.e $\triangle ABC \sim PQR$ $ AC^c = AB \times AD = \frac{AC}{AD} = \frac{AC}{AD}$				1/2
In $\triangle ABC$ and $\triangle ACD$ we have $ \angle ACB = \angle CDA \qquad [given] $ $ \angle CAB = \angle CAD \qquad [common] $ By AA similarity criterion we get $ \triangle ABC \sim \triangle ACD $ Thus $ \frac{AB}{AC} = \frac{BC}{CD} = \frac{AC}{AD} $ Now $ \frac{AB}{AC} = \frac{AC}{AD} $ $ AC^2 = AB \times AD $ $ 6^2 = AB \times 3 $ AB = $\frac{36}{3}$ = 12 cm Again, let PQ be height of pole and QR be its shad the same time, the angle of elevation of tree and pole equal i.e $\triangle ABC \sim PQR$	In $\triangle ABC$ and $\triangle ACD$ we have		$=\sin A + \cos A$		
In $\triangle ABC$ and $\triangle ACD$ we have $ \angle ACB = \angle CDA \qquad [given] \\ \angle CAB = \angle CAD \qquad [common] $ By AA similarity criterion we get $ \triangle ABC \sim \triangle ACD $ Thus $ \frac{AB}{AC} = \frac{BC}{CD} = \frac{AC}{AD} $ Now $ \frac{AB}{AC} = \frac{AC}{AD} $ % % % $ AC^{\theta} = AB \times AD $ 6² = $AB \times AD$ 6² = $AB \times AD$ 8 Again, let PQ be height of pole and QR be its shad the same time, the angle of elevation of tree and pole equal i.e $\triangle ABC \sim PQR $	In $\triangle ABC$ and $\triangle ACD$ we have $ \angle ACB = \angle CDA \qquad [given] \\ \angle CAB = \angle CAD \qquad [common] $ By AA similarity criterion we get $ \triangle ABC \sim \triangle ACD $ Thus $ \frac{AB}{AC} = \frac{BC}{CD} = \frac{AC}{AD} $ Now $ \frac{AB}{AC} = \frac{AC}{AD} $ $ AC^{\dagger} = AB \times AD $ $ 6^2 = AB \times 3 $ $ AB = \frac{36}{3} = 12 \text{ cm} $ 1 DIAG the same time, the angle of elevation of tree and poequal i.e. $\triangle ABC \sim PQR $		= RHS Hence proved.		
In $\triangle ABC$ and $\triangle ACD$ we have $ \angle ACB = \angle CDA \qquad [given] \\ \angle CAB = \angle CAD \qquad [common] $ By AA similarity criterion we get $ \triangle ABC \sim \triangle ACD $ Thus $ \frac{AB}{AC} = \frac{BC}{CD} = \frac{AC}{AD} $ Now $ \frac{AB}{AC} = \frac{AC}{AD} $ % % % $ AC^{\theta} = AB \times AD $ 6² = $AB \times AD$ 6² = $AB \times AD$ 8 Again, let PQ be height of pole and QR be its shad the same time, the angle of elevation of tree and pole equal i.e $\triangle ABC \sim PQR $	In $\triangle ABC$ and $\triangle ACD$ we have $ \angle ACB = \angle CDA \qquad \text{[given]} $ $ \angle CAB = \angle CAD \qquad \text{[common]} $ By AA similarity criterion we get $ \triangle ABC \sim \triangle ACD $ Thus $ \frac{AB}{AC} = \frac{BC}{CD} = \frac{AC}{AD} $ Now $ \frac{AB}{AC} = \frac{AC}{AD} $ $ AC^{l} = AB \times AD $ $ 6^{2} = AB \times 3 $ $ AB = \frac{36}{3} = 12 \text{ cm} $ 1 DIAG the same time, the angle of elevation of tree and poequal i.e. $\triangle ABC \sim PQR $				
$ \angle ACB = \angle CDA \qquad [given] $ $ \angle CAB = \angle CAD \qquad [common] $ By AA similarity criterion we get $ \Delta ABC \sim \Delta ACD $ Thus $ \frac{AB}{AC} = \frac{BC}{CD} = \frac{AC}{AD} $ Now $ \frac{AB}{AC} = \frac{AC}{AD} $ $ AC^a = AB \times AD $ $ 6^2 = AB \times 3 $ $ AB = \frac{36}{3} = 12 \text{ cm} $ $ Again, let PQ be height of pole and QR be its shad the same time, the angle of elevation of tree and pole equal i.e \triangle ABC \sim PQR $	$ \angle ACB = \angle CDA \qquad [given] $ $ \angle CAB = \angle CAD \qquad [common] $ By AA similarity criterion we get $ \Delta ABC \sim \Delta ACD $ Thus $ \frac{AB}{AC} = \frac{BC}{CD} = \frac{AC}{AD} $ Now $ \frac{AB}{AC} = \frac{AC}{AD} $ $ AC^9 = AB \times AD $ $ 6^2 = AB \times 3 $ $ AB = \frac{36}{3} = 12 \text{ cm} $ $ Again, let PQ be height of pole and QR be its shad the same time, the angle of elevation of tree and pole equal i.e \triangle ABC \sim PQR $	2			
$\angle CAB = \angle CAD \qquad [common]$ By AA similarity criterion we get $\triangle ABC \sim \triangle ACD$ Thus $\frac{AB}{AC} = \frac{BC}{CD} = \frac{AC}{AD}$ Now $\frac{AB}{AC} = \frac{AC}{AD}$ $AC^2 = AB \times AD$ $6^2 = AB \times 3$ $AB = \frac{36}{3} = 12 \text{ cm}$ Again, let PQ be height of pole and QR be its shad the same time, the angle of elevation of tree and pole equal i.e $\triangle ABC \sim PQR$			In $\triangle ABC$ and $\triangle ACD$ we have		
By AA similarity criterion we get $ \Delta ABC \sim \Delta ACD $ Thus $ \frac{AB}{AC} = \frac{BC}{CD} = \frac{AC}{AD} $ $ AC^{\varrho} = AB \times AD $ Now $ \frac{AB}{AC} = \frac{AC}{AD} $ $ AC^{\varrho} = AB \times AD $ $ AB = \frac{36}{3} = 12 \text{ cm} $ $ AB = \frac{36}{3} = 12 \text{ cm} $ 1 DIAG the same time, the angle of elevation of tree and polynomials are the same time, the angle of elevation of tree and polynomials are the same time, the angle of elevation of tree and polynomials are the same time, the angle of elevation of tree and polynomials are the same time, the angle of elevation of tree and polynomials are the same time, the angle of elevation of tree and polynomials are the same time, the angle of elevation of tree and polynomials are the same time, the angle of elevation of tree and polynomials are the same time, the angle of elevation of tree and polynomials are the same time, the angle of elevation of tree and polynomials are the same time, the angle of elevation of tree and polynomials are the same time, the angle of elevation of tree and polynomials are the same time, the angle of elevation of tree and polynomials are the same time, the angle of elevation of tree and polynomials are the same time, the angle of elevation of tree and polynomials are the same time, the angle of elevation of tree and polynomials are the same time, the angle of elevation of tree and polynomials are the same time, the angle of elevation of tree and polynomials are the same time, the angle of elevation of tree and polynomials are the same time, the angle of elevation of tree and polynomials are the same time, the angle of elevation of tree and polynomials are the same time, the angle of elevation of tree and polynomials are the same time, the angle of elevation of tree and polynomials are the same time, the angle of elevation of tree and polynomials are the same time, the angle of elevation of tree and polynomials are the same time.	By AA similarity criterion we get $ \Delta ABC \sim \Delta ACD $ Thus $ \frac{AB}{AC} = \frac{BC}{CD} = \frac{AC}{AD} $ $ Now \qquad \frac{AB}{AC} = \frac{AC}{AD} $ $ AC^e = AB \times AD $ $ 6^2 = AB \times 3 $ $ AB = \frac{36}{3} = 12 \text{ cm} $ $ Again, \text{ let } PQ \text{ be height of pole and } QR \text{ be its shad the same time, the angle of elevation of tree and pole equal i.e. } \Delta ABC \sim PQR $ $ 1 \text{ DIAG} $		$\angle ACB = \angle CDA$ [given]	C	
Thus $\frac{AB}{AC} = \frac{BC}{AD} = \frac{AC}{AD}$ Now $\frac{AB}{AC} = \frac{AC}{AD}$ $AC^2 = AB \times AD$ $6^2 = AB \times 3$ $AB = \frac{36}{3} = 12 \text{ cm}$ Again, let PQ be height of pole and QR be its shad the same time, the angle of elevation of tree and pole equal i.e $\triangle ABC \sim PQR$	Thus $\frac{AB}{AC} = \frac{BC}{CD} = \frac{AC}{AD}$ Now $\frac{AB}{AC} = \frac{AC}{AD}$ $AC^e = AB \times AD$ $6^2 = AB \times 3$ $AB = \frac{36}{3} = 12 \text{ cm}$ Again, let PQ be height of pole and QR be its shad the same time, the angle of elevation of tree and pole equal i.e $\triangle ABC \sim PQR$			\wedge	
Thus $\frac{AB}{AC} = \frac{BC}{CD} = \frac{AC}{AD}$ Now $\frac{AB}{AC} = \frac{AC}{AD}$ $AC^2 = AB \times AD$ $6^2 = AB \times 3$ $AB = \frac{36}{3} = 12 \text{ cm}$ $Again, let PQ \text{ be height of pole and } QR \text{ be its shad the same time, the angle of elevation of tree and pole equal i.e. } \Delta ABC \sim PQR$ 1 DIAG	Thus $\frac{AB}{AC} = \frac{BC}{CD} = \frac{AC}{AD}$ Now $\frac{AB}{AC} = \frac{AC}{AD}$ $AC^{\circ} = AB \times AD$ $6^{\circ} = AB \times 3$ $AB = \frac{36}{3} = 12 \text{ cm}$ Again, let PQ be height of pole and QR be its shad the same time, the angle of elevation of tree and pole equal i.e $\triangle ABC \sim PQR$ 1 DIAG				
Now $\frac{AB}{AC} = \frac{AC}{AD}$ $AC^{\circ} = AB \times AD$ $6^{\circ} = AB \times 3$ $AB = \frac{36}{3} = 12 \text{ cm}$ Again, let PQ be height of pole and QR be its shad the same time, the angle of elevation of tree and pole equal i.e $\triangle ABC \sim PQR$ 1 DIAG	Now $\frac{AB}{AC} = \frac{AC}{AD}$ $AC^2 = AB \times AD$ $6^2 = AB \times 3$ $AB = \frac{36}{3} = 12 \text{ cm}$ $Again, let PQ \text{ be height of pole and } QR \text{ be its shad the same time, the angle of elevation of tree and pole equal i.e.} \Delta ABC \sim PQR$ 1 DIAG				1
Now $\frac{AB}{AC} = \frac{AC}{AD}$ $AC^{\circ} = AB \times AD$ $6^{\circ} = AB \times 3$ $AB = \frac{36}{3} = 12 \text{ cm}$ Again, let PQ be height of pole and QR be its shad the same time, the angle of elevation of tree and pole equal i.e $\triangle ABC \sim PQR$ 1 DIAG	Now $\frac{AB}{AC} = \frac{AC}{AD}$ $AC^2 = AB \times AD$ $6^2 = AB \times 3$ $AB = \frac{36}{3} = 12 \text{ cm}$ $Again, let PQ \text{ be height of pole and } QR \text{ be its shad the same time, the angle of elevation of tree and pole equal i.e.} \Delta ABC \sim PQR$ 1 DIAG		Thus $\frac{AB}{AC} = \frac{BC}{CD} = \frac{AC}{AD}$		1/2
Now $\overline{AC} = \overline{AD}$ $AC^2 = AB \times AD$ $AC^2 = AB \times AD$ $AB = \frac{36}{3} = 12 \text{ cm}$ Again, let PQ be height of pole and QR be its shad the same time, the angle of elevation of tree and pole equal i.e $\triangle ABC \sim PQR$ 1 DIAG	Again, let PQ be height of pole and QR be its shad the same time, the angle of elevation of tree and poly equal i.e $\triangle ABC \sim PQR$				
$AC^{e} = AB \times AD$ $6^{2} = AB \times 3$ $AB = \frac{36}{3} = 12 \text{ cm}$ $Again, let PQ \text{ be height of pole and } QR \text{ be its shad the same time, the angle of elevation of tree and pole equal i.e. } \Delta ABC \sim PQR$ 1 DIAG	$AC^{\circ} = AB \times AD$ $6^{2} = AB \times 3$ $AB = \frac{36}{3} = 12 \text{ cm}$ $Again, let PQ \text{ be height of pole and } QR \text{ be its shad the same time, the angle of elevation of tree and pole equal i.e. } \Delta ABC \sim PQR$ 1 DIAG		Now $\frac{AC}{AC} = \frac{AC}{AD}$		
$AB = \frac{36}{3} = 12 \text{ cm}$ $Again, let PQ \text{ be height of pole and } QR \text{ be its shad the same time, the angle of elevation of tree and polynomial equal i.e.}}$ $ABC \sim PQR$ B $ABC \sim PQR$ B	$AB = \frac{36}{3} = 12 \text{ cm}$ $Again, let PQ \text{ be height of pole and } QR \text{ be its shad the same time, the angle of elevation of tree and pole equal i.e.} \Delta ABC \sim PQR$ 1 DIAG $\frac{A}{6 \text{ m}}$		$AC^{\ell} = AB \times AD$		
$AB = \frac{36}{3} = 12 \text{ cm}$ $Again, let PQ \text{ be height of pole and } QR \text{ be its shad the same time, the angle of elevation of tree and polynomial equal i.e.}}$ $ABC \sim PQR$ B $ABC \sim PQR$ B	$AB = \frac{36}{3} = 12 \text{ cm}$ $Again, let PQ \text{ be height of pole and } QR \text{ be its shad the same time, the angle of elevation of tree and pole equal i.e.} \Delta ABC \sim PQR$ 1 DIAG $\frac{A}{6 \text{ m}}$			A' D	
Again, let PQ be height of pole and QR be its shad the same time, the angle of elevation of tree and pole equal i.e \triangle $ABC \sim PQR$	Again, let PQ be height of pole and QR be its shad the same time, the angle of elevation of tree and pole equal i.e \triangle $ABC \sim PQR$			2	1/
Again, let PQ be height of pole and QR be its shad the same time, the angle of elevation of tree and pole equal i.e \triangle $ABC \sim PQR$	Again, let PQ be height of pole and QR be its shad the same time, the angle of elevation of tree and pole equal i.e \triangle $ABC \sim PQR$		$AB = \frac{50}{3} = 12 \text{ cm}$		/2
the same time, the angle of elevation of tree and poequal i.e \triangle $ABC \sim PQR$	the same time, the angle of elevation of tree and poequal i.e \triangle $ABC \sim PQR$			Α	+ -
the same time, the angle of elevation of tree and poequal i.e \triangle $ABC \sim PQR$	the same time, the angle of elevation of tree and poequal i.e \triangle $ABC \sim PQR$		Andre 14 DO hall the College Control of	Â	
equal i.e \triangle $ABC \sim PQR$	equal i.e \triangle $ABC \sim PQR$				1 DIAG
				6 m	
			equal to 11110 1 Wit		1/2
	C = 4 m				
				\overline{C} 4 m \overline{B}	

$\frac{AB}{BC} = \frac{PQ}{QR}$	1/2
	1/2
$PQ = \frac{50 \times 6}{4}$	
$=75\mathrm{m}$	1/2
 (i) We have used AA similarity criterion. (ii) Here. ∠ABC = ∠DEC (90° each) 	1
Since vertical opposite angle are equal,	1
Thus due to AA similarity criterion,	
and $\angle BAC = \angle CDE$ Therefore both are correct.	
Thus (a) is correct option.	1
We have $\frac{AB}{DE} = \frac{BC}{CE}$	
$\frac{60}{x} = \frac{50}{40} \implies x = 48 \text{ ft}$	1
Now $\sin 30^{\circ} = \frac{y}{30}$ $\frac{1}{2} = \frac{y}{30}$ $y = \frac{30}{2} = 15 \text{ m}$ $h = y + 5 = 15 + 5 = 20 \text{ m}$ Now $\cos 30^{\circ} = \frac{x}{30}$ $\frac{\sqrt{3}}{2} = \frac{x}{30}$ $x = \frac{30\sqrt{3}}{2} = 15\sqrt{3} \text{ m}$	1
	(i) We have used AA similarity criterion. (ii) Here, $\angle ABC = \angle DEC$ Since vertical opposite angle are equal, $\angle ACB = \angle DCE$ Thus due to AA similarity criterion,

	$\cos 30^\circ = \frac{x}{30}$	
	$\frac{\sqrt{3}}{2} = \frac{x}{30}$	
	$x = \frac{30\sqrt{3}}{2} = 15\sqrt{3} \text{ m}$	
	d = 60 - x - x	1/2
	a = 60 - x - x = $60 - 15\sqrt{3} - 15\sqrt{3}$	1/2
	$= 60 - 30\sqrt{3} = 30(2 - \sqrt{3})$	1/2
	= 30(2 - 1.732)	1/
35	$= 30 \times 0.268 = 8.04 \text{ m}$	1/2
	Let c represent the speed of the current and s represent	
	the cruising speed of the ship.	
	Trip to the Goa,	
	(s+c)70 = 1435	
	$2s + 2c = 41 \tag{1}$	1
	Return to Mumbai,	
	(s-c)82 = 1435	
	$2s - 2c = 35 \tag{2}$	1
	Adding eq (1) and (2) we have	
	$4s = 76 \Rightarrow s = 19 \text{ kmph}$	1
	Subtracting eq (2) from (1) we have	1
	$4c = 6 \Rightarrow s = 1.5 \text{ kmph}$	1
36	Let the sides of two squares be a and b ,	
	then $a^2 + b^2 = 400$ (1)	1/2
	and $4(a-b) = 16$	
	$a-b = 4 \Rightarrow a = 4+b$	1/2
	From equations (1) and (2) , we obtain	1/
	$(4+b)^2 + b^2 = 400$	1/2
	$16 + b^2 + 8b = b^2 = 400$	1/2
	$2b^2 + 8b - 384 = 0$	
	$b^2 + 4b - 192 = 0$	1
	$b^2 + 16b - 12b - 192 = 0$	1/2
	b(b+16) - 12(b+16) = 0	
	(b+16)(b-12)=0	1/4
	b = -16,12	1/2
	Rejecting the negative value, $b = 12$ cm	
	then $a = 4 + 12 = 16$ cm.	1/2

	OR	
	Let numerator be x , then denominator will be $x+2$.	1/2
	and fraction $=\frac{x}{x+2}$	1/2
	Now $\frac{x}{x+2} + \frac{x+2}{x} = \frac{34}{15}$	1/2
	$15(x^2 + x^2 + 4x + 4) = 34(x^2 + 2x)$	
	$30x^2 + 60x + 60 = 34x^2 + 68x$	
	$4x^2 + 8x - 60 = 0$	1
	$x^2 + 5x - 3x - 15 = 0$	1/2
	x(x+5) - 3(x+5) = 0	1/ . 1/
	$(x+5)(x-3) = 0$ $\therefore x = -5 \text{ or } x = 3$	1/2 + 1/2
	$fraction = \frac{3}{5}$	1
37		1
<i>3</i> ,	100 m	1 DIAG
	$A \xrightarrow{30^{\circ}} x D B$	
	Let DC be tower of height 100 m. A and B be two car on the opposite side of tower. As per given in question we have drawn figure below.	
	In right ΔADC ,	
	$\tan 30^{\circ} = \frac{CD}{AD}$	
	$\frac{1}{\sqrt{3}} = \frac{100}{x}$	
	$x = 100\sqrt{3} \qquad(1)$ In right ΔBDC ,	1
	$\tan 45^{\circ} = \frac{CD}{DB}$	
	$1 = \frac{100}{y} \Rightarrow y = 100 \text{ m}$	1

	Distance between two cars	
	AB = AD + DB = x + y	
	$= (100\sqrt{3} + 100)$	
	$= (100 \times 3 + 100)$ = $(100 \times 1.73 + 100)$ m	1 ½
		-
	= (173 + 100) m = 273 m Hence, distance between two ears is 273 m.	
20	Hence, distance between two cars is 273 m.	1/2
38	In $\triangle ABC$, $DP \parallel BC$	
	By BPT we have $\frac{AD}{DB} = \frac{AP}{PC}$,(1)	1
	Similarly, in $\triangle ABC$, $EQ \parallel AC$	
	$\frac{BQ}{QC} = \frac{BE}{EA} \qquad \dots (2)$	1/2
	From figure, $EA = AD + DE$	
	$= BE + ED \qquad (BE = AD)$	1
	Q = BD	
	Therefore equation (2) becomes, $BO = AD$	
	$\frac{BQ}{QC} = \frac{AD}{BD} \qquad(3)$	1/2
	From (1) and (3), we have $\frac{AP}{PC} = \frac{BQ}{OC}$	1/2
		/2
	By converse of BPT , $PO \parallel AB$ Hence Proved	1/2 + 1/2
39.	$\frac{PQ \parallel AB \qquad \text{Hence Proved}}{l(minor\ arc) = \frac{\theta}{360} \times 2\pi r = \frac{90}{360} \times 2 \times 3.14 \times 10 = 15.7cm}$	1
	360 360 360 Area of sector $OAPB$,	
	$= \frac{90}{360} \pi (10)^2 = 25 \pi \text{ cm}^2$	1
	Area of $\triangle AOB$, $=\frac{1}{2} \times 10 \times 10 = 50 \text{ cm}^2$	1
	Area of minor segment $AQBP$,	
	Hea of fillion segment $AQDI$, $= (25\pi - 50) \text{ cm}^2$	
	$= 25 \times 3.14 - 50$	1
	$=78.5-50=28.5 \text{ cm}^2$	_
	Also area of circle $=\pi(10)^2$	
	$=3.14 \times 100 = 314 \text{ cm}^2$	1
	Area of major segment $ALBQA = 314 - 28.5$	14
	$=285.5~\mathrm{cm^2}$	½ ½
	OR	-

$$3+r+2r+r+3=14$$

$$4r+6=14\Rightarrow r=2$$
Thus radius of the semi-circle formed inside is 2 cm and length of the side of square formed inside the semi-circle is 4 cm.

Area of square $ABCD$

$$=14\times14=196 \text{ cm}^2$$

$$=14\times14=196 \text{ cm}^2$$
Thus area of 4 semi circle $=4\times\frac{1}{2}\pi r^2$

$$=2\times3.14\times2\times2=25.12 \text{ cm}^2$$

$$=2\times3.14\times2\times2=25.12 \text{ cm}^2$$
1

Area of the square formed inside the semi-circle
$$(2r)^2=4\times4=16 \text{ cm}^2$$
Area of the shaded region,
$$= \text{area of square } ABCD$$

$$- (\text{Area of 4 semi-circle} + \text{Area of square})$$

$$=196-(25.12+16)$$
1

1

1/2

 $= 196 - 41.12 \, = 154.88 \, \, \mathrm{cm^2}$