

Batch: P-	3-2	Roll No.: 28
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Course : 1		
		ent / tutorial No. 9
- speninent		nature of the Faculty with date

	The state of the s						
Q1)	Given equation: $x^2 - 2x + 2 = 0$ x = 1 + 1, $1 - 1$						
	$\chi = 1+1$ , $1-1$						
	let $d = 1+i$ , $\beta = 1-i$						
Nº PA	$\alpha$ and $\beta$ can also be written as $\alpha = \sqrt{2} \cos \pi + i \sqrt{2} \sin \pi$						
	V = 72.08 11 +172510 11						
L	B - 15 COL TI - 1 15 Sin TI						
F 12 E	$\beta = \sqrt{2} \cos \Pi - i \sqrt{2} \sin \Pi$						
	LET FOU N'+B" = \JZCONTI + IVZ SINTI ], \JZCONTI - IVZ SINTI]						
ISEU M	to for $\sqrt{1+\beta^n} = \sqrt{2\cos \pi} + i\sqrt{2}\sin \pi$ 4  4  4  4  4  4  4  4  4  4  4  4  4						
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	BY DMVT						
	$= \left[\sqrt{2}^{\circ} \cos \Pi n + i\sqrt{2}^{\circ} \sin n \Pi\right]$						
	$+\sqrt{2}^{n}\cos \pi \pi - i\sqrt{2}^{n}\sin n\pi$						
	= 2 \( \frac{1}{2} \cos \frac{1}{4} \)						
	$\alpha n + \beta n = 2 \cdot 2 \cdot 2 \cdot \cos n\pi$						
	for $\chi 8 + \beta 8 = 2.28/2 \text{ COS} 2TT$						
	$\chi 8 + \beta 8 = 32$ [cos2 $\pi = 1$ ]						
	X0+B0=32 [(08211-1]						
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$$\begin{array}{ll}
\mathbb{C} & [1+i]^{3/4} = (\sqrt{2}\cos\pi + i\sqrt{2}\sin\pi)^{3/4} \\
& = (\sqrt{2})^{3/4} [\cos\pi + i\sin\pi]^{3/4} \\
& = (\sqrt{2})^{3/4} [\cos(2\kappa\pi + i\pi) + i\sin(2\kappa\pi + i\pi)^{3/4} \\
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& = (\sqrt{2})^{3/4} [\cos(2\pi\pi + i\pi) + i\sin(2\pi\pi + i\pi)] \\
& = (\sqrt{2})^{3/4} [\cos(2\pi\pi$$



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$$u = \log \tan \left( \frac{1}{4} + \frac{0}{2} \right)$$

① 
$$u = \log \tan \left( \frac{1}{4} + \frac{0}{2} \right)$$

$$e^{u} = tan(T + 0)$$
 [antilog]

$$e^{u} = 1 + \tan \pi/2 - 0$$

$$1 - \tan \pi/2$$

$$e^{-u} = 1 - \tan \theta / 2 - 2$$
 $1 + \tan \theta / 2$ 

$$= \frac{1 + \tan \pi/2}{1 - \tan \theta/2}$$

$$= \frac{1 + \tan \theta/2}{1 + \tan \theta/2}$$

$$= \frac{(1+\tan \theta/2)^2 + (1-\tan \theta/2)^2}{2-2(\tan^2 \theta)}$$

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$$= 2 + 2 \tan^2 \theta / 2$$

$$2 - 2 \tan^2 \theta / 2$$

Coshu = 
$$\frac{1}{\cos \theta}$$

Hence,  $\cosh u = \sec \theta - \theta$ 

TAT LANGE We know that sinhu = Vcoshu-1 from O sinhu = Vsec20-1 sinhu = Vtan20 sinhu = tano sinhu tanhu coshu from O \$ 0 tan 0 seco sing coso COSO (dn 0/2 = sin 0 tanhu Consider tanh u = sin hu/2 2 1011 (08 h u/2 2008h u/2 Multiply by 2 sinhu = sinhu 2008h2W2 1+coshu from O & D tano 1+seco sino/c000 (cos0 +1) /cos0 sino C080+1



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251n 0/2 cos 0/2 20082012 Sin 0/2 (08 0/2 Hence Proved itan u cosx + isind = cosx coshy - isinx sinhy Separating sink = -sink (sinh) Squaring & adding  $cos^2 x + sin^2 x = cos + co$ = (1+sinh²y) (1 sin²x) + sim²x . sinh²y = 1+sin²x + sinh²y - sinh²y . sin²y + sin²x sinh²  $0 = -\sinh^2 y - \sin^2 x$   $\pm \sinh y = \pm \sin^2 x - 0$ (prove COS 2x + COSh 2y = (1-Sin2.2)+(1+2sin hy 1-2sin2x + 1+2sinh2 but sin2x=sinh2y from O

 $\frac{11082x + cosh^2y = 2}{\text{Hence proved}}$ 

all lived  $50] \cosh^{-1}(\sqrt{1+x^2}) = \tanh^{-1}(x)$ LHS: = cosh - (VI+x2) = a  $\sqrt{1+\chi^2} = \cosh \alpha$  $1+x^2 = \cosh^2 a$ But  $1+\sinh^2 a = \cosh^2 a$   $x = \sinh a - 0$ Considering (VI) 2 = sinha : sinha = tanha cosha  $\frac{1}{1000} \frac{1}{1000} \frac{1}{1000} = a$   $\frac{1}{1000} \frac{1}{1000} \frac{1}{1000} = a$   $\frac{1}{1000} \frac{1}{1000} \frac{1}{1000} = a$ VAME OF THE RHS OF THE STATE OF THE Hence proved 1012 ) CA12 1 ( ) CA12 - 1) ( v dat y me vident y done it of JOHN A 6113 INC KINDERE



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og [sin (x+iy)] We know that sin (x+iy) = Sinx cosiy + cosx siniy = sinxcoshy + icosxsinhy log / sinx coshy + icosx sinhy Know that leg [x+iy] = 1 leg (x2+y2) + itan-1 (y · log (sinx coshy + i cosx sinhy) [coshysin'x+cos'xsinh'y]+itan (sinx) 1 leg (cosh²y(1-cos²x)+cos²x(cosh²y-1)]+itan-1(cot x 100 (cosh2y-cos222 cosh2y+cos22 cosh2y-cos22 leg [cosh2y-cos2x] + itan-1 (cotx tanhy) log [(1+cosh2y)-(1+cos2x)] + itan- (cotx - tanhy (cosh2y-cos2x)] proved Hence