

Batch:	5_3_ Roll No.:	160/01 23325
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Course :	AM-1	
Experiment /	assignment / tutorial N	10. 9
Grade:	Signature of the I	Faculty with date

01]	gf d, B are the roots of the eqn. $x^2 - 22 + 2 = 0$, p.T.
>	$d^n + \beta^n = 2 \cdot 2^{n/2} \cos n \times \text{Hence deduce}, d^8 + \beta^8 = 32$
	Given eqn: $\chi^2 - 2\chi + 2 = 0$
	$\alpha = 1 \pm i$
	fet d = 2+i , B = 1-i
	i d & B can also be written as:
	$d = \sqrt{2} \cos x + i \sqrt{2} \sin x$
	4
	$\beta = \sqrt{2} \cos x - i \sqrt{2} \sin x$
	for $d^n + \beta^n = \begin{bmatrix} \int_{\frac{\pi}{2}} \cos x + i \int_{\frac{\pi}{2}} \sin x \end{bmatrix}^n + \begin{bmatrix} \int_{\frac{\pi}{2}} \cos x - i \int_{\frac{\pi}{2}} \sin x \end{bmatrix}^n$
	By DeMoirre's Theorem,
	Hence,
	$A^{8} + B^{8} = 2.2^{8/2} \cos 8 \pi$
-	4
	= 2.2 COS ZK (:: (OSZN = 1)
	$d^8 + \beta^8 = 32$



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2	If $u = \log (\tan(\frac{\pi}{2} + \frac{\omega}{2}))$, $\rho \cdot \tau$ ∂ d	osu = $\sec \theta$, z) $\sin u = \tan \theta$ = $\tan \theta/z$
	$u = \log \tan \left(\frac{\pi}{4} + \frac{\sigma}{2} \right)$	
	taking anti-log	
	$e^{\alpha} = \tan\left(\frac{\pi}{4} + \frac{\theta}{2}\right) = \frac{1 + \tan \theta}{1 - \tan \theta}$	0/2
	e-u = 1-tan 8/2 _ 0 1 + tan 8/2	
		$\frac{2 + 2 + an^2 \theta/2}{2 - 2 + an^2 \theta/2}$
	coshu = 1	
	: cashu = seco	tophu = sinhu = tono
	we know that:	coshu steco
	Sinhu = Voshu-1	tonhu = Sino = 1 coso coso
	Sin hu = \sec^20 - 1	: tonhu = sino
	Sinhu = Jtan20	
	$sinhu = tan\theta$	· · · · · · · · · · · · · · · · · · ·
	Now, $\tanh u = \frac{\sinh u}{2}$ $(osh u)_2$	
	multiply by 2 coshu/2	

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: tanh u = sinhu
                              1+ cosh u
  : tan h u = tan o
                            1 + Seco
 \frac{1}{2} + \frac{\sin \theta}{2} = \frac{\sin \theta}{\cos \theta} = \frac{\sin \theta}{\cos \theta} = \frac{\cos \theta}{\cos \theta}
                     cos0 1+sec0
                                                     Coso
                                                              Cos0 +1
  tan = \frac{sin 0/2}{2}
                    COS0/2
 \frac{1}{2} + \tan \frac{\pi}{2} = \frac{1}{2}
if cos (x+iy) = coso + isina. P.T.
Sind = 1 Sin2 2 = + Sinh2y
cos 2z = t cosh 2y = 2
 (as (x+iy) = cosz cosiy - sinz siniy
 (OSA + isind = cosz coshy - isina sinhy
       cost = cosz costy
       Sind = - sin & sinhy
 : Squarring & Adding:
  cos a + sin2a = cos2x rosh2y + sin2x sinh2y
   1 = \cos^2 z \cosh^2 y + \sin^2 z \sinh^2 y
0 = \sinh^2 y - \sin^2 z
\therefore \pm \sinh^2 y = \pm \sin^2 x
Now, \cos 2x + \cosh 2y = 1 - 2\sin^2 x + 1 + 2\sinh^2 y (: \sin^2 x = \sinh^2 y)
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95]	$P \cdot \tau.$ $(osh^{-1} (1 + x^{2}) = +anh^{-1} (x)$
,	$(osh^{-1}(J_{1+x^{2}}) = +anh^{-1}(x)$ $(osh^{-1}(J_{1+x^{2}}) = \alpha = LMS$
	$1 + 3^2 = \cosh a$ $1 + 3^2 = \cosh^2 a$
	But, $1 + \sinh^2 \alpha = \cosh^2 \alpha$ $2 = \sinh \alpha$
	Now, $x = \sinh a = \tanh a$ $\sqrt{1 + 2^{\perp}} = \cosh a$
	tanti = a (sinha) = a
	$\frac{1}{\sqrt{1+x^2}} = \alpha = RHS$
	:. Hence Proved

QET Find value of log [sin(x+iy)] Sin (2+iy) = sinz cosiy + cosz siniy = sinz coshy + icos z sinhy : log [sin (z+iy)] = log [sinz cochy + i sinhy rosz] we know, log [2+iy] = 1 log (22+y2) + itan-1 (4) log (sinz (oshy + i cosz sinhy)
= 1 log [cosh²y - cos²z] + itan² (cotz.tanhy) = 1 log [1 (cosh 2y - (os 22) + itan-1 (cotz. tanhy) Hence, log (sincirtiy)) = 1 | og [1 (cost) 2y-10522) + itan (cot x. tonhy)]