MATH-M415 CLASS NOTES "COMPLEX VARIABLES AND HARMONIC/ANALYTIC FUNCTIONS" "Elementary Complex: Variables" Addisus. Sa multiplication PLTS: Proof Left To Student S. 1) (S,1) - Suni-Qualitative Approach (2),5-) Specifics ignored irrelevant Polar Coordinates 'used'; not explicitly in book - Often Evaluating Integrals · 2 - 6tm Ex. If f'(2) exists, significant restrictions.

are imposed on f(Z). x - alpha Ex. [Circles ove the most important red shape may not be the same precause equiv. of the square. distance => side Size of distance Think of the Both of the 5 z
red snapes as though may
we have a ved
Rubber Band match the Shape of the black cin be without snagging?

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Algebra in the Plane - real plane is denoted as IR2 - The set of all ordered pairs & (x,y): x, y ETR } Add/Sub. Sc. multiplication (1,2) 5. (1,2) make the of that foot 181.19 + (-3,4) = (5.1,5:2) with all - inner (-2,6) = (5,10) vi) soupi siñasque Greek letters: ION (Soul 2 showishow) 2 - eta a- omega (85) harry α - alpha 1 - gamma + Def. 1 some If Z=(2,4) ER2 the norm (abs. val., modulus of 2 is |Z = \[\frac{72}{492} Def. Let 7 = (x,y) and Z= (xo,yo). Then the distance between 2 and to 20 12-201 = V(x-x0)2+(y-y0)2 distance => size

7 6

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X Stize #> distance Both of the se

Det. Let r > 0 and Zo be a fixed point in R2. The disc of radius , with center D(Zoir) = {ZER2: /Z-Zo/<r}

9977		3
	-6	
	5 N	Domains in the Plane II ? 100000 A 1.100
	Q.	$\Omega = \mathbb{R}^2$ Normally use Ω to regressent the donewin.
		S2 - 1/2 The donewin.
	9	Q= {(x,y): 0 = x = 1,0 < y = 1} non A
-		if and only if it can be written
7	The same of the sa	as 20 = 20, UD, where 20, 20, are con was
	Def	1 Let 170 and to be a fixed point in
		\mathbb{R}^2 . The set
Tin I		D(Zoir) = {2 E R2: Z - 20 4 r 3
Unio		is the closed disc of radius r with center
	.4.	Complete of the day from descent of
-VI		
		Note that closed discs have points which
		are interior points and points which are
		not interior points. Laterno to 2019, 2019
9		1.43
		D(x; r) cA. Tryo such that
		D(x; r) CA. 8.58/(1:800)
		3 A= EZ Cacle 1 Cbs Chare of Cb of Kind
		[x.] O O (2x.)
		The 2 above,
		continuesly getting (loser 0.414 1/2 Dissilar to this sidea.
		D.7 14 12 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
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-	4-	More so, a disc which is "particulty closed"
		is notorial land roago of the fr place
	D	ef. A chest DCR2
	6	ef. 1 A subset 52 CR2 is open if and only if
		every point of I is an interior point.
-		As long as the inside not included it is still open.
1		1 1 -pen.

Def. A subset SCRZ is closed if and only of the complement set R2/S is open. Def. 1 An open subset ILCIR2 is disconnected if and only if it can be written as $\Omega = \Omega_1 \cup \Omega_2$ where Ω_1, Ω_2 are non-unpty and disjoint it Going from & -> B makes that disconnected. If a set is not disonnected it is connected. Examples of Connected Siets of winder down 1) D(Zoir) \2Zo3 Disk where we ignore the X 3) A= {z: a<|z|263 where a 25 are real nubers 6 Topologically & and 3 are the Same. 2 has a tiny hole, 3 has a fat hole Def. A subset ILCR2 is a domain if and only if it is open and connected. If MS Paint could fill it in on one dump it is connected in the to the

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