

Lec  
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# Cauchy's (Integral) Theorem

If  $f(z)$  is analytic  
in a simple connected domain  
 $D$ ,

then for every simple closed  
path  $C$  in  $D$

$$\oint_C f(z) dz = 0$$

This is what we expect

→ as  $f(z)$  is analytic in  $D$

→ we can integrate using  
method 1

→ to get  $F(\text{end point}) - F(\text{START POINT})$

[where  $F'(z) = f(z)$ ]

→ If the  $\text{END POINT} = \text{START POINT}$

$$F(\text{end point}) - F(\text{START POINT}) = 0.$$