

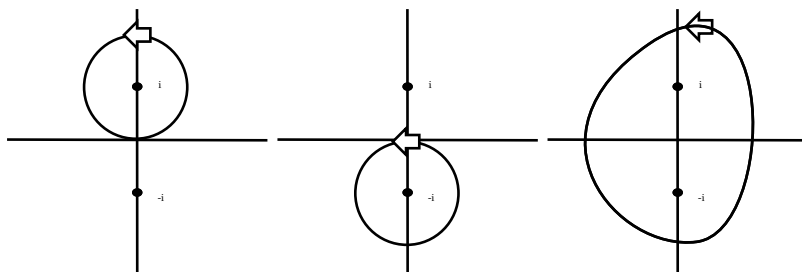
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Homework 10  
Due: Friday, November 3

1. Integrate the function

$$f(z) = \frac{1}{z^2 + 1}$$

over each of the following contours:



(HINT: What is  $\frac{1}{z+i} - \frac{1}{z-i}$ ?)

2. [BC] 48.5

3. Let  $C$  be the unit circle taken once in the positive direction.

(a) Explain why the Cauchy integral formula does not directly apply to

$$\int_C \frac{\operatorname{Re}(z)}{z - 1/2} dz. \tag{1}$$

(b) Show that if  $|z| = 1$ , then  $\operatorname{Re}(z) = (z + z^{-1})/2$ .

(c) Use this to evaluate (1).

4. [BC] 50.1.

5. [BC] 50.4.