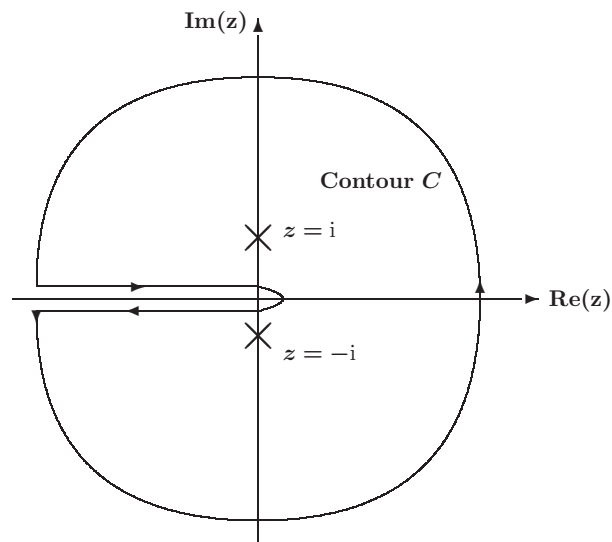


**Task 1** (30 extra points)  
Calculate the integral

$$J = \oint_C \frac{z^{3/2}}{(z^2 + 1)^2} dz \quad (1)$$

taken along the contour  $C$  shown in the following figure,



by an appropriate choice of the branch cut of the  $z^{3/2}$  function, and evaluating the value of the integrand above and below the branch cut. Use integral table lookup in the final step if necessary. Verify your result by residue calculus.

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The tasks are due Thursday, 30-SEP-2021. Have fun doing the problems!