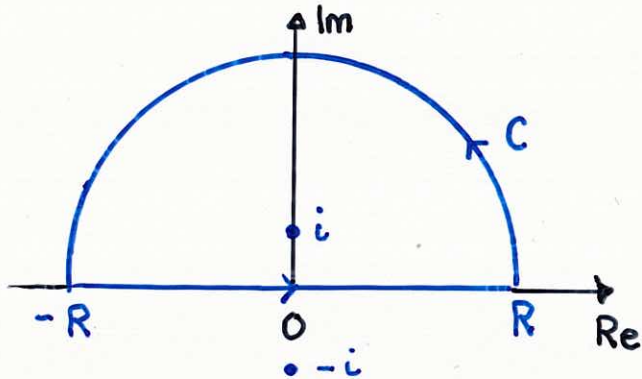


Oppgave 15.4.9

$$\text{pr. v. } \int_{-\infty}^{\infty} \frac{dx}{(1+x^2)^2} = ?$$

IDÉ : • Lage enkel, lukket stykkevis glatt kurve C der $[-R, R]$ er del av kurven



1. Beregne $\oint_C f(z) dz$ ved residyregning

2. La $R \rightarrow \infty$

3. Vise at $\lim_{R \rightarrow \infty} \int_C f(z) dz = 0$

3. Trekantulikhetene : $|a \pm b| \leq |a| + |b|$
 $|a \pm b| \geq |a| - |b|$

ML-ulikheten : $\left| \int_C f(z) dz \right| \leq ML$; $|f(z)| \leq M$ på C

$$\left| \int_C f(z) dz \right| \leq M \cdot \pi R, \quad |f(z)| = \left| \frac{1}{(1+z^2)^2} \right| \leq \frac{1}{(R^2-1)^2}$$
$$\leq \frac{\pi R}{(R^2-1)^2} \rightarrow 0 \quad (\text{standardknep})$$