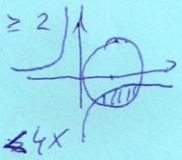
4.18 g

$\mathrm{Im}\, z + \mathrm{Im}\left(\bar{z}^2 - \bar{z}\right) \geq 2 \rightarrow y + \mathrm{Im}\left(x^2 + 2xyi - y^2 - x + iy\right) \geq 2$



$y - 2xy - y \geq 2 \rightarrow \boxed{-1 \geq xy}$

$\frac{1}{4} \geq \mathrm{Re}\left(\frac{1}{z}\right) = \mathrm{Re}\left(\frac{1}{x+iy} \cdot \frac{x-iy}{x-iy}\right) = \mathrm{Re}\left(\frac{x-iy}{x^2+y^2}\right) = \frac{x}{x^2+y^2} \rightarrow x^2 + y^2 \leq 4x$

$\boxed{(x-2)^2 + y^2 \leq 4}$