

$$\begin{aligned}
 f(z) &= \frac{1}{z^2} = \frac{1}{(x+iy)^2} = \frac{1}{(x^2 + (xyi - y^2))} = \\
 &= \frac{1}{(x^2 + y^2 + 2xyi)(x^2 - y^2 - 2xyi)} = \frac{x^2 - y^2 - 2xyi}{(x^2 + y^2 + 2xyi)(x^2 - y^2 - 2xyi)} = \\
 &= \frac{x^2 - y^2 - 2xyi}{x^4 - 2x^2y^2 + y^4 + 4x^2y^2} = \frac{x^2 - y^2 - 2xyi}{(x^2 + y^2)^2} \\
 \# \operatorname{Re} z &= \frac{x^2 - y^2}{(x^2 + y^2)^2} \quad \operatorname{Im} z = \frac{-2xy}{(x^2 + y^2)^2}
 \end{aligned}$$