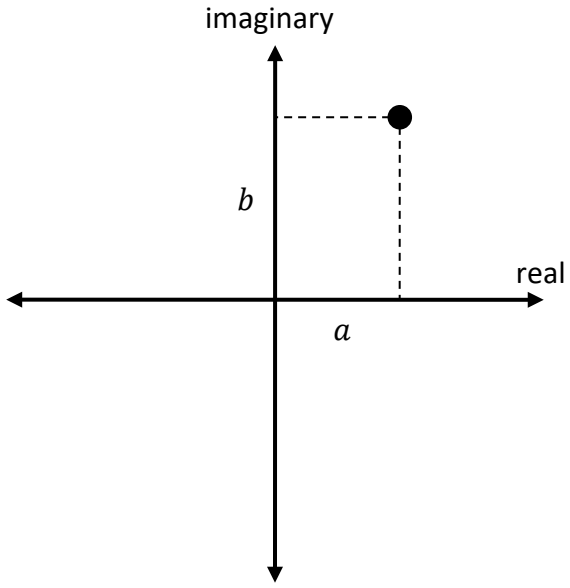
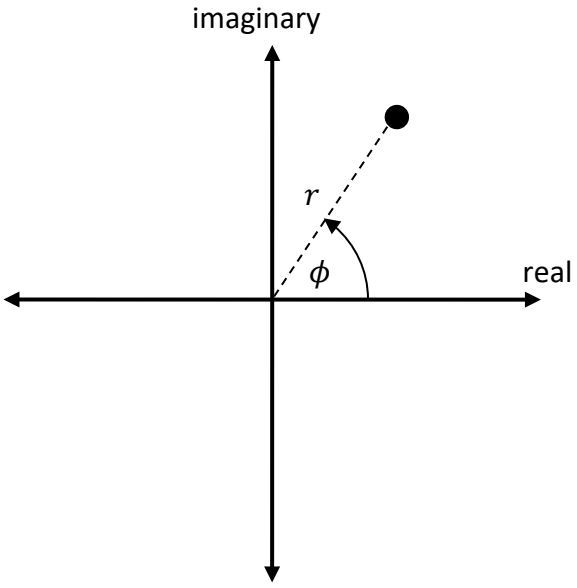
Very Brief Refresher on Complex Numbers

Cartesian form:



Polar form:



	Cartesian Form	Polar Form
Definition	$a + ib$	$r\cos(\phi) + i\, r\sin(\phi)$ $= r[\cos(\phi) + i\sin(\phi)]$ $= \boldsymbol{re^{i\phi}}$ (by Euler's formula)
Multiplication	$(a_1 + ib_1)(a_2 + ib_2)$ $= (a_1a_2 - b_1b_2) + i(a_1b_2 + a_2b_1)$	$\left(r_1e^{i\phi_1}\right)\left(r_2e^{i\phi_2}\right)$ $= r_1r_2e^{i(\phi_1+\phi_2)}$
Complex Conjugate	$(a + ib)^* = (a - ib)$	$\left(re^{i\phi}\right)^* = \left(re^{-i\phi}\right)$
Magnitude $\lvert c\rvert^2 = c^*c = cc^*$	$(a + ib)(a - ib) = a^2 + b^2$	$\left(re^{i\phi}\right)\left(re^{-i\phi}\right) = r^2$

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