

When you multiply...

- magnitude  $|z|, |w|$  multiplies

- direction adds

$$|z| = \sqrt{z \cdot \bar{z}}$$

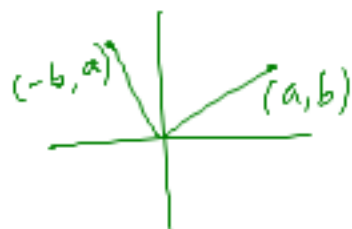
$$\frac{1}{|N|} = \frac{|M|}{|MN|}$$

$$|zw| = \sqrt{zw \cdot \bar{z}\bar{w}} \quad \text{unproved}$$

$$= \sqrt{z \cdot w \cdot \bar{z} \cdot \bar{w}} = \sqrt{z \cdot \bar{z} \cdot w \cdot \bar{w}}$$

$$= |z| \cdot |w|$$

Why does multiplication by  $i$  perform a 90 degree rotation?



$$(a + bi)i = -b + ai$$