

$$x = r \cos \theta$$

$$y = r \sin \theta$$

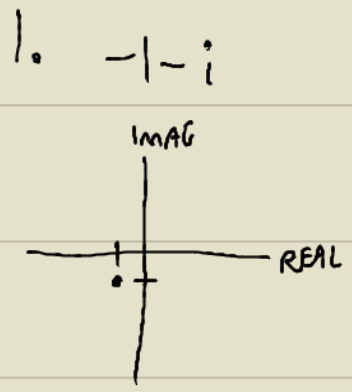
$$\cos \theta = \frac{x}{r}$$

$$\sin \theta = \frac{y}{r}$$

$$\tan \theta = \frac{y}{x}$$

$$r^2 = x^2 + y^2$$

$$r = \sqrt{x^2 + y^2}$$



$$x = -1 \quad y = -1$$

① FIND r

$$r = \sqrt{x^2 + y^2}$$

$$r = \sqrt{(-1)^2 + (-1)^2}$$

$$r = \sqrt{1+1}$$

$$r = \sqrt{2}$$

② TRY TO SEE IF IT IS ON UNIT CIRCLE

$$\cos \theta = \frac{x}{r} = \frac{-1}{\sqrt{2}} = \frac{-\sqrt{2}}{2}$$

$$\sin \theta = \frac{y}{r} = \frac{-1}{\sqrt{2}} = \frac{-\sqrt{2}}{2}$$



$$\left(\frac{-\sqrt{2}}{2}, \frac{-\sqrt{2}}{2} \right) \text{ so } \theta = 225^\circ$$

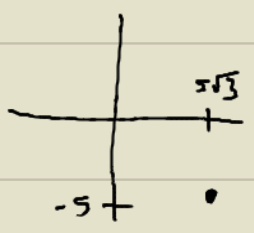
③ IF ② FAILS USE

$$\tan \theta = \frac{y}{x}$$

POLAR FORM $r(\cos \theta + i \sin \theta)$

$$\sqrt{2}(\cos 225^\circ + i \sin 225^\circ)$$

2. $5\sqrt{3} - 5i$



$$x = 5\sqrt{3} \quad y = -5$$

① FIND r

$$r = \sqrt{x^2 + y^2}$$

$$r = \sqrt{(5\sqrt{3})^2 + (-5)^2}$$

$$r = \sqrt{75 + 25}$$

$$r = \sqrt{100}$$

$$r = 10$$

② $\cos \theta = \frac{x}{r} = \frac{5\sqrt{3}}{10} = \frac{\sqrt{3}}{2}$

$$\sin \theta = \frac{y}{r} = \frac{-5}{10} = -\frac{1}{2}$$

$$\left(\frac{\sqrt{3}}{2}, -\frac{1}{2} \right)$$

$$\theta = 330^\circ$$

$r(\cos \theta + i \sin \theta)$

$$10(\cos 330^\circ + i \sin 330^\circ)$$