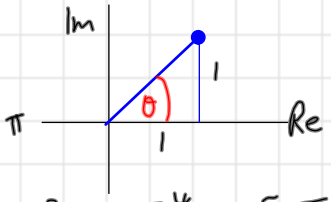
Homework:
Use de Moivre's theorem to evaluate

① $(1+i)^4$

Polar

$r = \sqrt{1^2+1^2} = \sqrt{2}$



$\theta = \frac{\pi}{4}$

de moivre

$[1+i]^4 = \left[\sqrt{2}\left(\cos\frac{\pi}{4} + i\sin\frac{\pi}{4}\right)\right]^4$

$= \sqrt{2}^4\left(\cos 4\frac{\pi}{4} + i\sin 4\frac{\pi}{4}\right)$

$= 4(-1+0i)$

$= -4$

Homework:
Use de Moivre's theorem to evaluate

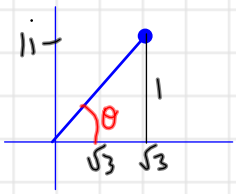
② $(\sqrt{3}+i)^4$

Polar

$r=?$

$\theta=?$

$r = \sqrt{\sqrt{3}^2+1^2} = \sqrt{3+1} = \sqrt{4} = 2$



$\theta = \tan^{-1}\left(\frac{1}{\sqrt{3}}\right) = \frac{\pi}{6}$

de moivre

$[\sqrt{3}+i]^4 = \left[2\left(\cos\frac{\pi}{6} + i\sin\frac{\pi}{6}\right)\right]^4$

$= 2^4\left[\cos 4\frac{\pi}{6} + i\sin 4\frac{\pi}{6}\right]$

$= 16\left[-\frac{1}{2} + \frac{\sqrt{3}}{2}i\right]$

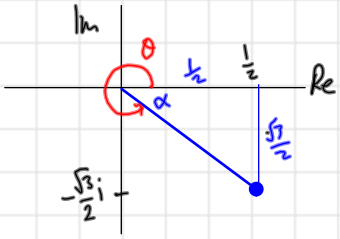
$= -8 + 8\sqrt{3}i$

Homework:
use de Moivre's theorem to evaluate

Polar Form
$r=?$
$\theta=?$

③ $\left(\frac{1}{2}-\frac{\sqrt{3}}{2}i\right)^4$

$r=\sqrt{\left(\frac{1}{2}\right)^2+\left(\frac{\sqrt{3}}{2}\right)^2}=\sqrt{\frac{1}{4}+\frac{3}{4}}=\sqrt{1}=1$



$\tan\alpha=\left(\frac{\sqrt{3}/2}{1/2}\right)=\sqrt{3}$

$\alpha=\tan^{-1}\sqrt{3}$

$=\pi/3$

$\theta=2\pi-\pi/3=5\pi/3$

$\left[\frac{1}{2}-\frac{\sqrt{3}}{2}i\right]^4=\left[1\left(\cos\frac{5\pi}{3}+i\sin\frac{5\pi}{3}\right)\right]^4$

use de Moivre

$=1^4\left[\cos 4\left(\frac{5\pi}{3}\right)+i\sin\left(4\frac{5\pi}{3}\right)\right]$

use calculator

$=-\frac{1}{2}+\frac{\sqrt{3}}{2}i$