

Panel 1

① Find both square roots of  $(-i)$

② Find the three cube roots of  $(-8i)$

③ Find the five fifth roots of  $1$  and of  $(1+i)$

④ Let  $\omega_k = e^{i \frac{2k\pi}{n}}$ ,  $k=0,1,2,\dots,n-1$ . Show

a)  $\omega_k$ ,  $k=0,1,\dots,n-1$  are  $n$   $n^{\text{th}}$ -roots of unity (1)

b)  $1 + \omega_1 + \omega_2 + \dots + \omega_{n-1} = 0$

Use the Lemma:  $1 + z + z^2 + \dots + z^{n-1} = \frac{1-z^n}{1-z}$  (without proof)

Extra credit: Review the Geometric Series in your  
Calculus Book and prove the Lemma