THIS IS IT!

DEMOIVRE'S THEOREM

square

cube.

4^{th}

square root

cube root $\boxed{5}$

$\boxed{10^{th} \text{ roots}}$

$\underline{a}+bi$

Powers

$$\boxed{z = r(\cos\theta + i\sin\theta)}$$

$$z^2 = z \cdot z = r^2\left(\cos(\theta+\theta) + i\sin(\theta+\theta)\right)$$

$$= r^2\left(\cos(2\theta) + i\sin(2\theta)\right)$$

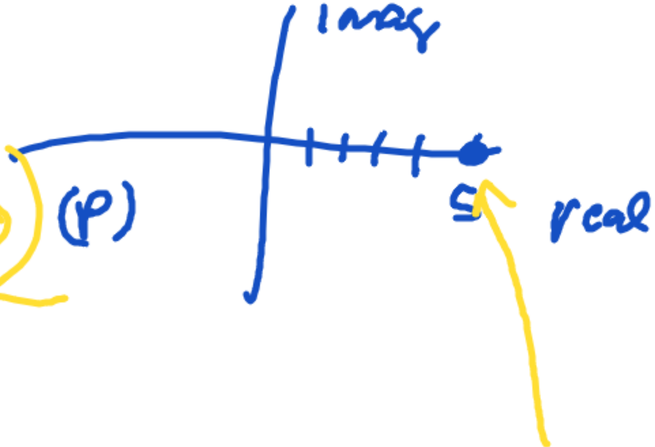
$$z^3 = z \cdot z \cdot z = z^2 \cdot z = r^3\left(\cos 3\theta + i\sin 3\theta\right)$$

$$\boxed{z^n = r^n\left(\cos(n\theta) + i\sin(n\theta)\right)}$$

$5^3 = \underline{125}$

$5 = 5 + 0i$ (R)

$= 5(\cos 0 + i \sin 0)$ (P)



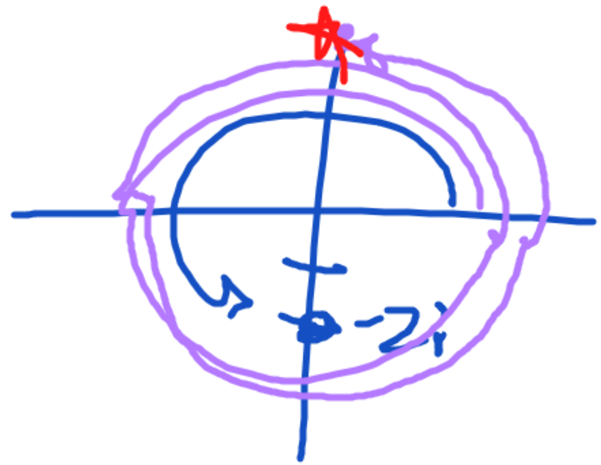
$5^3 = 5^3\left(\underline{\cos(3 \cdot 0)} + i \sin(\underline{3 \cdot 0})\right)$

$125(1 + 0i)$

$= 125$

$$(-2i)^3 = (-2i)(-2i)(-2i)$$

$$= -8i^3 = -8\overset{-1}{i^2}\cdot i = 8i$$



$$-2i = 2\left(\cos\frac{3\pi}{2} + i\sin\frac{3\pi}{2}\right)$$

$$(-2i)^3 = 2^3\left(\cos\left(\frac{9\pi}{2}\right) + i\sin\left(\frac{9\pi}{2}\right)\right)$$

$$= 8(0 + i)$$

$$(-2i)^3 = 8i$$

Roots

$$z^3 = r^3(\cos 3\theta + i\sin 3\theta)$$

$$z = \sqrt[3]{r}\left(\cos\frac{\theta}{3} + \text{period} + \ldots\right.$$

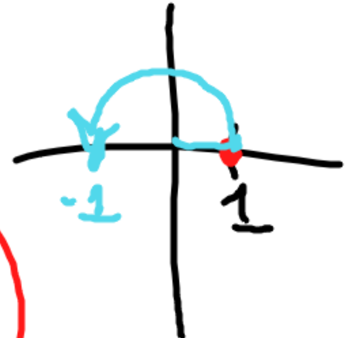
There are $\underline{n}$ "n-th roots" of any complex number.

$$\sqrt[n]{z} = \sqrt[n]{r(\cos\theta + i\sin\theta)}$$

$a+bi$

$$\boxed{\sqrt[n]{z} = \sqrt[n]{r}\left(\cos\frac{\theta+2\pi k}{n} + i\sin\frac{\theta+2\pi k}{n}\right)}$$

$$\sqrt{1} = \sqrt{1(\cos 0 + i\sin 0)}$$



$$= \sqrt{1}\left(\cos\frac{0+2\pi k}{2} + i\sin\frac{0+2\pi k}{2}\right)$$

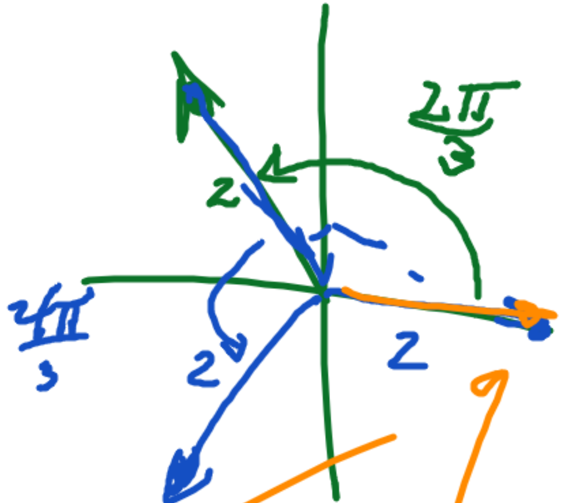
$$1 \Leftarrow \boxed{= \underbrace{1(\cos 0 + i\sin 0)}_{k=0}}$$

$$\boxed{= \underbrace{1(\cos\pi + i\sin\pi)}_{k=1}} \Rightarrow -1$$

$$\sqrt[3]{8} = 2, \_\_, \_\_$$

$$8 = 8(\cos 0 + i\sin 0)$$

$$\sqrt[3]{8} = \sqrt[3]{8}\left(\cos\frac{0+2\pi k}{3} + i\sin\frac{0+2\pi k}{3}\right)$$



$k=0$ 1) $2(\cos 0 + i\sin 0) = 2$ ✓

$k=1$ 2) $\boxed{2\left(\cos\frac{2\pi}{3} + i\sin\frac{2\pi}{3}\right)}$

$k=2$ 3) $2\left(\cos\frac{4\pi}{3} + i\sin\frac{4\pi}{3}\right)$

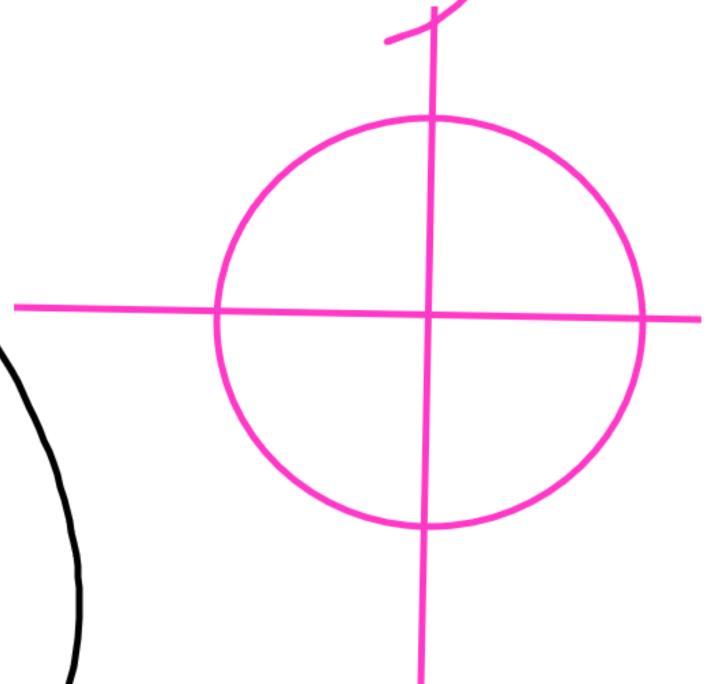
$k=3$ 4) $\cancel{2(\cos 2\pi + i\sin 2\pi)}$

$$2\left(\cos\frac{2\pi}{3} + i\sin\frac{2\pi}{3}\right)$$

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

$$= \boxed{-1 + \sqrt{3}i}$$

$$\sqrt[5]{1} = \sqrt[5]{1}\left(\cos\frac{0+2\pi k}{5} + i\sin\frac{0+2\pi k}{5}\right)$$



1 $= 1(\cos 0 + i\sin 0) = 1$

2 $= 1\left(\cos\frac{2\pi}{5} + i\sin\frac{2\pi}{5}\right)$

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

4 $= 1\left(\cos\frac{6\pi}{5} + i\sin\frac{6\pi}{5}\right)$

5 $= 1\left(\cos\frac{8\pi}{5} + i\sin\frac{8\pi}{5}\right)$

$\longrightarrow \frac{10\pi}{5} = 2\pi \approx 0$

6.6C p453 54-72 (x3), 87, 88

Mon 5/11 Practice Final #1

T W Th 11:30

1-3 4-7 8-11

27/28/29

T

May 26

Final DropIn OH

Mon 5/18 PF #2

T W Th 11:30