

In  $\mathbb{C}$ , let  $A$  be the set of solns to

$$z^3 - 8 = 0$$

Let  $B$  be the set of solns to

$$z^3 - 8z^2 - 8z + 64 = 0$$

What is the greatest dist between a  $p$

of A and a pt of B?

$$(z-2)(z^2+2z+4) = 0$$

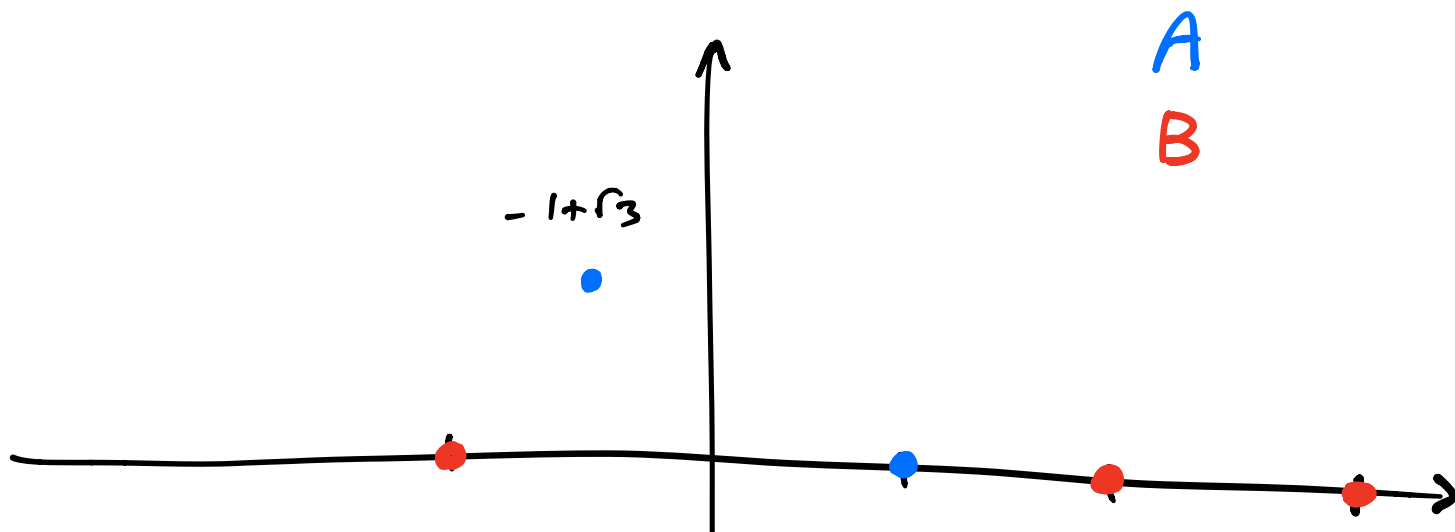
$$z=2 \quad \text{or} \quad z = \frac{-2 \pm \sqrt{4-16}}{2}$$
$$= \frac{-2 \pm 2\sqrt{3}i}{2}$$
$$= -1 \pm \sqrt{3}i$$

$$(z^3-8z) - (8z^2-64) = 0$$

$$z(z^2-8) - 8(z^2-8) = 0$$

$$(z^2-8)(z-8) = 0$$

$$z=8 \quad \text{or} \quad z = \pm\sqrt{8} = \pm 2\sqrt{2}$$



$-2\sqrt{2}$ 

2

2

8

 $-1-\sqrt{3}$ 

Looking for greatest distance between a red pt and a blue point. That would be 8 and either of  $-1 \pm \sqrt{3}i$ :

We have distance

$$\begin{aligned}d &= \sqrt{(0 - \sqrt{3})^2 + (8 - (-1))^2} \\&= \sqrt{3 + 81} \\&= \sqrt{84} \\&= \sqrt{4 \times 21} \\&= 2\sqrt{21}\end{aligned}$$