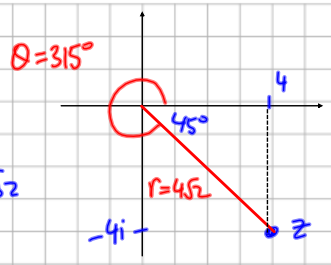
8. Express $4 - 4i$ in polar form.

Hence find the value of $\dfrac{1}{(4-4i)^3}$.



let $z = 4-4i$

$r = \sqrt{4^2+4^2} = \sqrt{32}$

$r = 4\sqrt{2}$

Polar form

$z = 4\sqrt{2}\,\text{Cis}\,315°$

$\dfrac{1}{z^3} = z^{-3}$

$(r\text{Cis}\theta)^n = r^n\text{Cis}\,n\theta$

$z^{-3} = (4\sqrt{2})^{-3}\,\text{Cis}(-3)(315°)$

$= \dfrac{1}{128\sqrt{2}}\,\text{Cis}(-945°)$

$= \dfrac{1}{128\sqrt{2}}\left(-\dfrac{\sqrt{2}}{2} + \dfrac{\sqrt{2}}{2}i\right)$

$= \dfrac{-\sqrt{2}\,1}{128\sqrt{2}(2)} + \dfrac{\sqrt{2}\,1}{128\sqrt{2}(2)}i$

$= \dfrac{-1}{256} + \dfrac{1}{256}i$