1.7 Roots of complex numbers

1) Put complex number in polar form

i.e.:

$$z = 4(\cos 90° + i\sin 90°)$$

$$\therefore \sqrt{z} = 4^{\frac{1}{2}}\left(\cos\left(\frac{90° + (360°)k}{2}\right) + i\sin\left(\frac{90° + (360°)k}{2}\right)\right)$$

$z^{\frac{1}{2}}$

These are $\frac{1}{2} \cdot (90° + (360°)k)$

$\frac{1}{2} \Rightarrow (n)$ in the formula booklet

Then take [three] consecutive integers for k (e.g. $-1, 0, 1$) and find the roots.

↳ depends on what root we're finding

$z^{\frac{1}{3}}$ - 3 values of k

$z^{\frac{1}{2}}$ - 2 values of k

$z^{\frac{1}{4}}$ - 4 values of k