When to use pattern

$i = i$, $i^2 = -1$, $i^3 = -i$, $i^4 = 1$ ..... ?

① When we multiply 2 imaginary parts we use that $i^2 = 1$

eg.. $(1-2i)(2+3i) = 2+3i-4i \pm 6\cancel{i^2} = 8-i$

② When we have to evaluate some simple imaginary number to a power

eg.. evaluate i^{33} ?

since 4 is a factor of 32 $\Rightarrow i^{32} = 1$

$\Rightarrow i^{33} = i$

③ Not practical for $(a+bi)^n$ if $n > 3$

eg. $(1+2i)^{16}$ it is too cumbersome to expand by multiplying by itself 16 times $\Rightarrow$ use de Moivre.