 De Moivre’s Theorem

Proof by mathematical induction

Prove

Step 1: Show true for .

true for

Step 2: Assume true for where is a positive integer.

i.e.

Step 3: Show true for

i.e. Show )

from step 2

)

Step 4: Proven by mathematical induction

Trigonometric identities

Use De Moivre’s theorem to prove each trigonometric identity.

In each case assume

by expansion

3

and

using De Moivre’s theorem

Equating the imaginary components of (i.e. coefficients of )

3

and

Equating the real components of

Divide the numerator and denominator by

Equating the imaginary components of (i.e. coefficients of )

Equating the real components of

Divide the numerator and denominator by

and