Sum of Series

We can extend our knowledge of geometric series into complex numbers, where the same formulae hold true.

For ,

provided

**IMPORTANT:** One of

Remember:

Thus if we had an expression of the form , we could cleverly factorise out (i.e. half the power) to get

Thus where occurs in a fraction, multiply numerator and denominator by so that we have just

**Example**

**Given that , where is a positive integer, show that**

**Practise the factorising……...**

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Using mod-arg form to split summations

 **is a geometric series,**

Converting each exponential term to modulus-argument form would allow us to consider the real and imaginary parts of the series separately:

**Example**

**, for , where is an integer.**

1. **Show that**

**Let and**

**(b) Use your answer to part a to show that and find similar expressions for and**