**2A Method of Differences**

1. Show that:
2. Hence, prove using the method of differences that:
3. Verify that

And hence find the following using the method of differences:

1. Find the following summation using the method of differences:
2. Express the following using partial fractions:
3. Hence prove, by the method of differences, that:

Where a and b are constants to be found.

1. Find the value of the following to 5 decimal places:

**2B Higher Derivatives for Maclaurin Series**

1. Given that:

Find the value of:

1. Given that:
2. Show that:
3. By differentiating the result twice more with respect to x, find f’’(x) and f’’’(x)
4. Deduce the values of f(0), f’(0), f’’(0) and f’’’(0)

**2C Maclaurin Series**

1. Given that f(x) = ex can be written in the form:

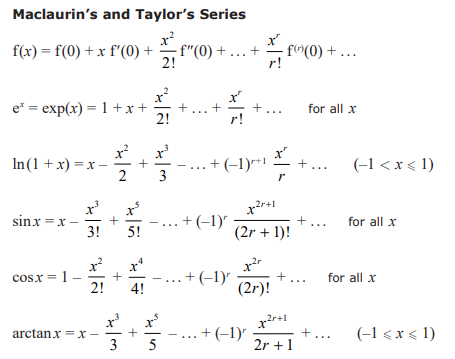
And that it is valid to differentiate an infinite series term by term, show that:

Generalising:

1. Express ln(1 + x) as an infinite series in ascending powers of x, up to and including the term in x3
2. Using this series, find approximate values for:
3. ln(1.05)
4. ln(1.25)
5. ln(1.8)
6. Find the Maclaurin expansion for sinx, up to the term in x5. Then use your expansion to find an approximation for sin10˚.
7. Find the Maclaurin expansion for cosx, up to the term in x4.
8. Proving Euler’s relation:

**2D Composite Maclaurin Series**

Formula Book Formulae:



1. Write down the first 4 non-zero terms in the series expansion of cos(2x2)
2. Find the first 4 non-zero terms in the series expansion of:
3. Given that terms in xn, n > 4 can be ignored, show, using the series expansions of ex and sinx, that: