# Sequences and Series 2

1. Given $f(x) = \dfrac{1}{(x-2)^4}$, $|x| < 1$,

   obtain the Maclaurin expansion of $f(x)$ as far as the term in $x^4$.

2. Write down Maclaurin expansion of $\cos x$ and hence find the first three non-zero term of the Maclaurin expansion for $f(x) = \cos 3x$.

3. Using the Maclaurin expansion of $e^x$, calculate $e^{0.2}$ correct to 3 decimal places.

4. Find the expansion of $f(x) = (1 + 2x)\ln(1 + x)$ as far as the term in $x^5$.

5. Given that $\dfrac{1}{1-x} = 1 + x + x^2 + x^3 + x^4 + \ldots$, $|x| < 1$, find the first 5 terms in the expansion of

   $f(x) = \dfrac{3}{1 + x - 2x^2}$ and state the region of validity for $x$.

   *(Hint: use partial fractions)*