Core 2 – Binomial Expansion

Challenge 1

(a)   Write down the first four terms in ascending powers of x in the expansion of

$$(1 + x)^8 \,,$$

     simplifying your coefficients as much as possible. *(2 marks)*

(b)   Find the coefficient of x^3 in the expansion of $(3 - 2x)(1 + x)^8$. *(2 marks)*

Challenge 2

Expand $(3 - 2x)^4$ in ascending powers of x and simplify each coefficient. **(4)**

Challenge 3

(a) Expand $(1 + 3x)^8$ in ascending powers of x up to and including the term in x^3. You should simplify each coefficient in your expansion. **(4)**

(b) Use your series, together with a suitable value of x which you should state, to estimate the value of $(1.003)^8$, giving your answer to 8 significant figures. **(3)**

Final Challenge

The coefficient of x^2 in the binomial expansion of $(1 + kx)^7$, where k is a positive constant, is 525.

(a) Find the value of k. **(3)**

Using this value of k,

(b) show that the coefficient of x^3 in the expansion is 4375, **(2)**

(c) find the first three terms in the expansion in ascending powers of x of

$$(2 - x)(1 + kx)^7.$$ **(3)**