1.7 Binomial Theorem $(n \in \mathbb{N})$

Over two days:

day 1: develop Pascal's Triangle then do Ex1-3

Day 2: general term formula and fun problems

Ex 1 Expand:

(a) $(a + b)^2$ (b) $(a + b)^3$ (c) $(a + b)^0$ (d) $(a + b)^1$

When expanding $(a + b)^4$ it is important to know that every term will be some combination of a's and b's that is 4 letters long and the coefficient represents the number of combinations of that particular letter string possible. aaab takes 4 because of the 4 ways that it could be written. (aaab, aaba, abaa, baaa)

In order to write out the full expansion of $(a + b)^4$ you have to consider both the number of instances of each combination of letters but also the number of different combinations in total. Consider the number of b's you could have: 0, 1, 2, 3, or 4. Then consider how many of each type will occur.

Ex 2 Expand

(a) $(a + b)^4$ (b) $(a + b)^5$

Ex 3 Expand

(a) $(3x + 4)^4$ (b) $\left(2x - \frac{1}{x}\right)^3$

In the expansion of $\left(x^2 + \frac{4}{x}\right)^{12}$, find:

a the coefficient of x^6 **b** the constant term.

Ex 4

(a) Write down the quadratic expression $2x^2 + x - 3$ as the product of two linear factors.

(b) Hence, or otherwise, find the coefficient of x in the expansion of $(2x^2 + x - 3)^8$

p.197#1bottom half, 6,9

p.200#2,6,7,9,12