

# Binomial Expansion



**Remember:**

$$(a + b)^n = a^n + \binom{n}{1}a^{n-1}b + \binom{n}{2}a^{n-2}b^2 + \dots + \binom{n}{r}a^{n-r}b^r + \dots + b^n$$

**i. Write out the first 5 rows of Pascal's Triangle.**

**ii. Using the  $\binom{n}{k}$  button on your calculator, find the value of the following binomial coefficients.**

•  $\binom{7}{3}$

•  $\binom{7}{6}$

•  $\binom{3}{1}$

•  $\binom{6}{4}$

•  $\binom{10}{4}$

•  $\binom{17}{9}$

**iii. Use the factorial button on your calculator to find the value of the following expressions.**

•  $7!$

•  $3!$

•  $8! - 4!$

•  $\frac{13!}{8!}$

**iv. • Use binomial expansion to expand  $(1 - 2x)^4$ .**

• Using your answer, calculate  $(-3)^4$

**v. • Expand out the bracket, by hand:  $(2 + 3x)^3$**

• Using the binomial theorem, verify that your answer above is correct.

**vi. Expand and simplify:**

$$(2 + 5x)^3 - (1 - 3x)^4$$