Factorial Notation

Notation:

For example, suppose you had three letters, A, B and C, and wanted to arrange them in a line to form a ‘word’, e.g. ACB or BAC.

* There are 3 choices for the first letter.
* There are then 2 choices left for the second letter.
* There is then only 1 choice left for the last letter.

There are therefore $3×2×1=3!=6$ possible combinations.

**Your calculator can calculate a factorial using the** $x!$ **button.**

For example, if you are a football team captain and need to choose 4 people from amongst 10 in your class, there are $\left(\begin{matrix}10\\4\end{matrix}\right)=\frac{10!}{4!6! }=210$ possible selections.

*(Note: the* $\left(\begin{matrix}10\\4\end{matrix}\right)$ *notation is preferable to* $10C4$*)*

**Use the** $nCr$ **button on your calculator (your calculator input should display “10C4”)**

Examples:

Calculate the value of the following. You may use the factorial button, but not the nCr button.

1. $5!$ b) $\left(\begin{matrix}5\\3\end{matrix}\right)$
2. $0!$ d) $\left(\begin{matrix}20\\1\end{matrix}\right)$

e) $\left(\begin{matrix}20\\0\end{matrix}\right)$ f) $\left(\begin{matrix}20\\2\end{matrix}\right)$

g) $\left(\begin{matrix}20\\2\end{matrix}\right)$ g) $\left(\begin{matrix}20\\18\end{matrix}\right)$

Exercise 8B Page 162