

## Activity 5

## Choices

**Aim:** Solve counting problems.

Complete the table.

	Scenario	Expression	Value
	How many different ways are there of:		
1.	selecting a committee of 4 people from a group of 10?	$C_4^{10}$	
2.	arranging 6 books on a book shelf?	$6!$	
3.	creating a 4-digit postcode?	$9 \times 10 \times 10 \times 10$	
4.	making three letter “words” from 8 different letters?		336
5.	selecting committees of two girls and three boys chosen from 10 girls and 8 boys?	$C_2^{10} \times C_3^8$	
6.	getting seven heads in 12 tosses of a fair coin?		792
7.	selecting a leadership team of 5 from a playing group of 35? The captain must be part of the leadership team.		
8.	selecting six numbers from 45 for a lotto ticket?		
9.	selecting a committee of ____ people from a group of ____?	${}^{20}C_3$	
10.	arranging 4 identical copies of a maths book and 3 identical copies of a novel on a book shelf?	$\frac{7!}{3! \times 4!}$	
11.	creating a 6-digit pin, without the digits 4 or 5 and beginning with a 1 or 2?		65 536
12.	arranging the letters of “googol”?		

13.	selecting committees of ___ girls and 2 boys chosen from 7 girls and ___ boys?	${}^7C_4 \times {}^9C_2$	
14.	getting 2 heads in ___ tosses of a fair coin?		190
15.	selecting a leadership team of 3 from a playing group of ___? The 2 injured players are excluded.		455

## Learning notes

Definitions:

$$n! = n(n-1)(n-2)\dots 1$$

$${}^n C_r \text{ or } \binom{n}{r} = \frac{n!}{(n-r)!r!} \text{ read as } n \text{ choose } r$$

Where  $n$  choose  $r$  is the number of different ways of choosing  $r$  objects out of a possible  $n$ .

## Construction

- Press **Keyboard**
- Tap **▼** tap **Advance**
- Select factorial (!) or nCr as required.

The screenshot shows a ClassPad calculator interface. The display shows the calculation of 6! (720) and the combination function  $\frac{6!}{4!2!} = 15$ . Below the display, the 'Catalog' menu is open, showing options for factorial (!), nPr, and nCr. The 'Advance' menu is also visible, showing options for a\_n, b\_n, c\_n, and rSiv. The 'Number' menu is also visible, showing options for +1, +2, and n. The 'Function' menu is also visible, showing options for F\_n, F\_n^+, L\_n, L\_n^+, and Gamma. The 'Operator' menu is also visible, showing options for delta, delta^+, and H. The 'System' menu is also visible, showing options for ans and EXE. The 'Mode' menu is also visible, showing options for Alg, Standard, Real, and Rad.