

Chapter 1 / **Example 47****Calculating values using factorials**

There are eight boys and five girls who attend the Senior Mathematics Club. Find how many ways the teacher can choose a team of six students to represent the school in a competition if:

- There are no gender restrictions.
- The team is to be made up of three girls and three boys.
- At least two of each gender are included in the team.

Type 13, press  $\text{DEL}$  [f2] 8:nCr and type 6.

Press  $\text{enter}$ .

$${}^{13}C_6 = 1716.$$

${}^{13}C_6$	1716
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Type 8, press  $\text{DEL}$  [f2] 8:nCr and type 3. Press  $\text{right arrow}$ .

Press  $\times$ , type 5, press  $\text{DEL}$  [f2] 8:nCr and type 3.

Press  $\text{enter}$ .

$${}^8C_3 \times {}^5C_3 = 560.$$

${}^{13}C_6$	1716
${}^8C_3 \times {}^5C_3$	560
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Type 13, press  $\text{DEL}$  [f2] 8:nCr and type 6. Press  $\text{right arrow}$ .

Press  $-$ , type 8, press  $\text{DEL}$  [f2] 8:nCr and type 5. Press  $\text{right arrow}$ .

Press  $\times$ , type 5, press  $\text{DEL}$  [f2] 8:nCr and type 1. Press  $\text{right arrow}$ .

Press  $-$ , type 8, press  $\text{DEL}$  [f2] 8:nCr and type 6. Press  $\text{right arrow}$ .

Press  $\times$ , type 5, press  $\text{DEL}$  [f2] 8:nCr and type 0. Press  $\text{right arrow}$ .

Press  $-$ , type 8, press  $\text{DEL}$  [f2] 8:nCr and type 1. Press  $\text{right arrow}$ .

Press  $\times$ , type 5, press  $\text{DEL}$  [f2] 8:nCr and type 5.

Press  $\text{enter}$ .

$${}^{13}C_6 - {}^8C_5 \times {}^5C_1 - {}^8C_6 \times {}^5C_0 - {}^8C_1 \times {}^5C_5 = 1400.$$

${}^{13}C_6$	1716
${}^8C_5 \times {}^5C_1$	560
${}^{13}C_6 - {}^8C_5 \times {}^5C_1 - {}^8C_6 \times {}^5C_0 - {}^8C_1 \times {}^5C_5$	1400
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Chapter 1 / **Example 47****Calculating values using factorials**

Type 8, press  $\boxed{\text{DEL}}$   $\boxed{\text{DEL}}$   $\boxed{\text{DEL}}$   $\boxed{\text{DEL}}$  [f2] 8:nCr and type 2. Press  $\boxed{\blacktriangleright}$ .

Press  $\times$ , type 5, press  $\boxed{\text{DEL}}$   $\boxed{\text{DEL}}$   $\boxed{\text{DEL}}$   $\boxed{\text{DEL}}$  [f2] 8:nCr and type 4. Press  $\boxed{\blacktriangleright}$ .

Press  $+$ , type 8, press  $\boxed{\text{DEL}}$   $\boxed{\text{DEL}}$   $\boxed{\text{DEL}}$   $\boxed{\text{DEL}}$  [f2] 8:nCr and type 3. Press  $\boxed{\blacktriangleright}$ .

Press  $\times$ , type 5, press  $\boxed{\text{DEL}}$   $\boxed{\text{DEL}}$   $\boxed{\text{DEL}}$   $\boxed{\text{DEL}}$  [f2] 8:nCr and type 3. Press  $\boxed{\blacktriangleright}$ .

Press  $+$ , type 8, press  $\boxed{\text{DEL}}$   $\boxed{\text{DEL}}$   $\boxed{\text{DEL}}$   $\boxed{\text{DEL}}$  [f2] 8:nCr and type 4. Press  $\boxed{\blacktriangleright}$ .

Press  $\times$ , type 5, press  $\boxed{\text{DEL}}$   $\boxed{\text{DEL}}$   $\boxed{\text{DEL}}$   $\boxed{\text{DEL}}$  [f2] 8:nCr and type 2.

Press  $\boxed{\text{enter}}$ .

$${}^8C_2 \times {}^5C_4 + {}^8C_3 \times {}^5C_3 + {}^8C_4 \times {}^5C_2 = 1400.$$

$13^6$	1716
${}^8C_3 \times {}^5C_3$	560
$13^6 - {}^8C_5 \times {}^5C_1 - {}^8C_6 \times {}^5C_0 - {}^8C_1 \times {}^5C_5$	1400
${}^8C_2 \times {}^5C_4 + {}^8C_3 \times {}^5C_3 + {}^8C_4 \times {}^5C_2$	1400