

A club consists of four girls and six boys.

a. In how many ways can a committee of three people be chosen?

b. In how many ways can two boys and two girls be chosen to attend a competition?

c. In how many ways can three boys be chosen?

d. What is the probability that three boys will be chosen?

a) We can choose a committee of three people in $C_3^{4+6} = C_3^{10} = \frac{10!}{3!7!} = \frac{8 \cdot 9 \cdot 10}{1 \cdot 2 \cdot 3} = 120$ ways.

b) C_2^4 for girls and C_2^6 for boys, so we can choose 2 boys and 2 girls in $C_2^4 C_2^6 = \frac{4!}{2!2!} \cdot \frac{6!}{2!4!} = \frac{6!}{2 \cdot 2 \cdot 2} = 90$ ways.

c) $C_3^6 = \frac{6!}{3!3!} = 20$

d) $P = \frac{m}{n} = \frac{C_3^6}{C_3^{10}} = \frac{20}{120} = \frac{1}{6}$