

A group consists of 15 people: 5 Americans, 6 Canadians and 4 Mexicans.

- (a) In how many ways can a sub-group of 4 people be selected?
- (b) In how many ways can a sub-group of 4 people consist of all Canadians?
- (c) What is the probability that a sub-group will consist of all Canadians?
- (d) In how many ways can a sub-group of 4 people consist of 2 Canadians and 2 Mexicans?
- (e) In how many ways can a sub-group of 4 consist of 1 American, 1 Mexican and 2 Canadians?

Solution

- (a) **In how many ways can a sub-group of 4 people be selected?**

(5+6+4 people choose 4)=(15 people choose 4)= $C(15,4)=1365$ ways

- (b) **In how many ways can a sub-group of 4 people consist of all Canadians?**

(6 Canadians choose 4)= $C(6,4)=15$ ways

- (c) **What is the probability that a sub-group will consist of all Canadians?**

$$P(\text{all Canadians}) = \frac{6}{15} * \frac{5}{14} * \frac{4}{13} * \frac{3}{12} * \frac{2}{11} * \frac{1}{10} = 0.0002$$

- (d) **In how many ways can a sub-group of 4 people consist of 2 Canadians and 2 Mexicans?**

(6 Canadians choose 2) times (4 Mexicans choose 2)= $C(6,2)*C(4,2)=15*6=90$ ways

- (e) **In how many ways can a sub-group of 4 consist of 1 American, 1 Mexican and 2 Canadians?**

(5 Americans choose 1) times (4 Mexicans choose 1) times (6 Canadians choose 2)= $C(5,1)*C(4,1)*C(6,2)=5*4*15=300$ ways