# Permutations & Combinations - exercises

**Exercise 1 - permutations**

There are five people running a race, and the *first three* will be awarded first, second, and third place trophies. How many different ways can the trophies be awarded?

**Exercise 2 - permutations**

a. Forty-three race cars started the 2010 Daytona 500. How many ways can the cars finish first, second, and third?

b. The board of directors of a company has 12 members. One member is the president, another is the vice president, another is the secretary, and another is the treasurer. How many ways can these positions be assigned?

**Exercise 3 - combinations**

There are five people, Alice, Bob, Charlie, Dawn and Edgar, in a jury pool. Three of them will be randomly selected to participate in a jury. Make a list of all possible selections. How many possible selections are there?

**Exercise 4 - combinations**

A state's department of transportation plans to develop a new section of interstate highway and receives 16 bids for the project. The state plans to hire four of the bidding companies. How many different combinations of four companies can be selected from the 16 bidding companies?

**Exercise 5 - combinations & probability**

A jury pool consists of 5 men and 7 women. If 4 people are to be randomly selected for a jury, what is the probability

a. that all 4 will be women?

*How many ways are there of choosing 4 people (from the whole group of 12)?*

*How many ways are there of selecting 4 women (out of 7 women)?*

*Now divide to find the probability.*

b. that 3 will be women and 1 will be a man?

*How many ways of choosing 3 women? How many ways of choosing 1 man? Multiply these!*

*How many ways of choosing 4 people altogether?*