



MATH 164
PERMUTATION and COMBINATIONS

N = total number in the set to choose from
R = number of items you want to actually choose

Permutation order is important nPr = N! / (N-R)!

Select 3 people without replacement out of 50
50P3 = 50! / (50-3)! = 50! / 47! = 50 * 49 * 48 * 47! / 47! = 50 * 49 * 48 = 1.176E5

or use calc to get 50 MATH -> PRB -> nPr ENTER 3 ENTER = 1.176E5

use Permutation - order is important

How many five-book arrangements can be made from a collection of 8 books?
How many arrangements of a collection of 5 books can be made if all of them are to be used in an arrangement?

Combination order is not important nCr = N! / ((N-R)! R!)

Select 3 people with replacement out of 50
50C3 = 50! / ((50-3)! 3!) = 50! / (47! 3!) = 50 * 49 * 48 * 47! / (47! 3!) = 50 * 49 * 48 / (3 * 2 * 1) = 117600 / 6 = 19600

or use calc to get 50 MATH -> PRB -> nCr ENTER 3 ENTER = 19600

use Combination - order is not important

In how many ways can a five-card hand of cards be drawn from a standard deck of 52 cards if exactly three of them must be spades?
Use two combination formulas (13C3) (39C2)

In how many ways can a five-card hand of cards be drawn from a standard deck of 52 cards if three of them must be spades and two must be hearts?
Use two combination formulas (13C3) (13C2)

The board of directors of a golf club contains 7 men and 4 women.

In how many ways can a hospitality committee of five members be chosen from this group if exactly two of them must be women?

Use two combination formulas (4C_2) (7C_3)

In how many ways can the five member committee above be chosen if at least three of them must be men?

Use 7C_3

In how many ways can the five member committee be chosen if it doesn't matter whether members are men or women?

Use ${}^{11}C_5$

Two cards are drawn from a standard deck of 52 cards. What is the probability that both are hearts?

Use $\frac{{}^{13}C_2}{{}^{52}C_2}$

One card is drawn from a standard deck of 52 cards.

What is the probability that it is a 4 or a 7?

$$P(4 \cup 7) = (4/52) + (4/52)$$

What is the probability that it is a 4 or a heart?

$$P(4 \cup H) = (4/52) + (13/52)$$