

Test Review

Problem Types

How many results are possible if a coin is flipped 5 times?

In this diagram, each coin toss is a box:



A head or a tail is possible in each toss.

Thus, the number of ways is:

$$= 2^5$$

$$= 32$$

A photographer lines up 6 people. How many arrangements can she make?



Thus the number of ways is:

$$= 6 \times 5 \times 4 \times 3 \times 2 \times 1$$

$$= 6!$$

$$= 720$$

A committee has 15 people. In how many ways can the president, vice-president and secretary be chosen?



Thus the number of ways is:

$$= 15 \times 14 \times 13$$

$$= {}_{15}P_3$$

$$= 2730$$

How many permutations of the letters of the word
DIPLOMA have L in the middle position?



Lock L in place. Remove one from n and r.

Thus the number of ways is:

$$= 6!$$

$$= 720$$

How many permutations of the letters of the word
DIPLOMA have O and I together?



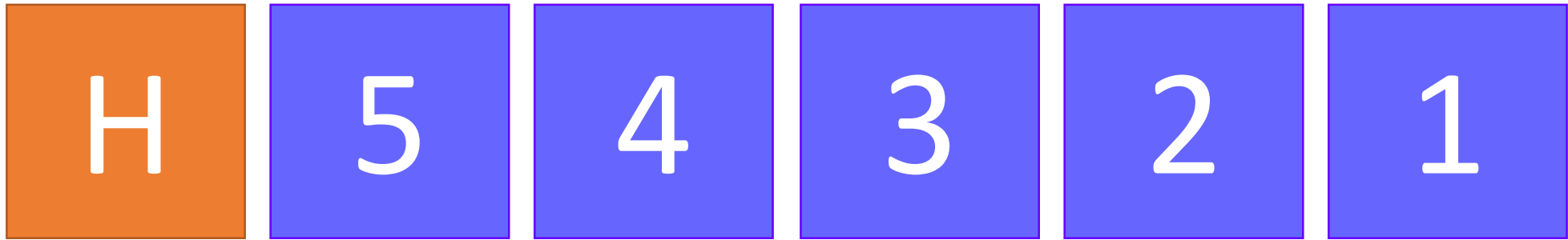
Then, calculate how many places it can go AND x2 switch

Thus the number of ways is:

= $5! \times 6$ places $\times 2$ can switch

= 1440

6 people sit around a table. In how many orders can they sit?



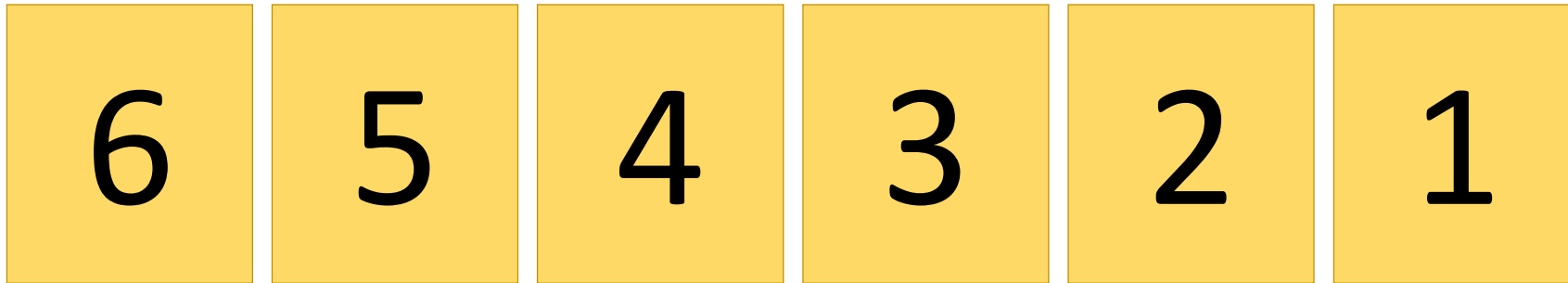
Thus the number of ways is:

$$= (n-1)!$$

$$= 5!$$

$$= 120$$

How many ways can all the letters of CANADA be rearranged?



The letter A is repeated 3 times. Those repetitions need to be removed.

Thus, the number of ways is:

$$\begin{aligned} & 6! \\ = & \frac{6!}{3! (A's)} \\ = & 120 \end{aligned}$$

How many ways can 3 letters of CANADA be rearranged?

Case 1: All 3 the same

= 1 way



Case 3: All differ

= 4!

= 24 ways



A, N, D, C

Case 2: 2 same, 1 differ

= 3 x 3 places

= 9 ways



N, D, C

Total ways

= 1 + 9 + 24

= 36 ways

The roster of a hockey team contains 10 forwards, 5 defence, and two goalies. How many teams can be chosen if a team needs 3 forwards, two defence, and one goalie?

Forward	Defence	Goalie
$n = 10$	$n = 5$	$n = 2$
$r = 3$	$r = 2$	$r = 1$

Thus, the number of ways is:

$$= {}^{10}C_3 \times {}^5C_2 \times {}^2C_1$$

$$= 120 \times 10 \times 2$$

$$= 2,400$$

How many two digit numbers can be formed from the digits 1, 2, 3, 4, 5 if repetition is allowed?

In how many ways can 6 people be seated at a round table?

Find the number of ways in which 10 beads can be arranged to form a necklace.

There are 12 people on a swim team. Four are selected to take part in a relay, racing in the order they are selected. In how many ways can this be done?

From a group of six tennis players, 2 players are needed to play a singles match and a foursome is needed for doubles. In how many ways can this be done?

Find the number of ways in which four girls and three boys can arrange themselves in a row so that none of the boys is together.

A TV show has eight 30-second advertisement time slots. In how many ways could the eight advertisements be assigned a time?

A computer randomly selects three different numbers from between 1 and 100. In how many ways can this be done?

How many two digit numbers can be formed from the digits 1, 2, 3, 4, 5 if repetition is not allowed?

On the assembly line at Micro Manufacturing, six digit serial numbers are assigned to products according to the following regulations: only the digits 4 to 9 are used; no digit may be used twice in the same serial number. How many serial numbers are possible under this system?

How many arrangements of the word KETCHUP are possible?

From a group of five men and four women, determine how many committees of five people can be formed with exactly 4 men.

In how many ways can 8 bushes be arranged around a flagpole?

A choir has learned eight songs for its spring concert. In how many different ways can the director arrange 3 of them to form the concert program?

An investment club with five members wants to select a president and a vice-president. In how many ways can this be done?

Emilo has picked up his textbooks for the seven courses he will study this year. In how many ways can he arrange them on his bookshelf if he wants to keep the French and German texts side by side?

A ship carries four signal flags of different colours. How many different signals can be sent by hoisting all 4 of these flags on the ship's flagpole in various orders?

The manager of a baseball team has picked nine players for the starting line up. In how many ways can he set the batting order so that the pitcher bats last?

Find the number of ways of arranging the letters of **MATCHING** if the odd-numbered positions must remain unchanged.

A coin is tossed nine times. In how many ways could the results be six heads and three tails?

How many numbers are greater than 30,000 that only use the digits 1, 1, 1, 2, 2, 3?

How many ways can 11 players be seated on the team bench so that Joey and Jill are not seated next to each other?

In how many ways can all of the letters of
SASKATCHEWAN be arranged?

How many 2 letter arrangements of SUCCESS are possible?

The science club is to work in pairs on an experiment. If there are eight members present, how many pairs can be formed?

A committee of six is to be chosen from the 25 members of the student council to organize Spirit Week. In how many ways can this be done if there are 14 junior members and 11 senior and the committee must include four juniors and 2 seniors?

A bunk house at a camp has three rooms containing 3 beds, 2 beds and 5 beds respectively. In how many ways can 10 campers be assigned to these three rooms?

The Greek alphabet contains 24 letters. How many different Greek letter fraternity names can be formed using either two or three letters? Repetitions are allowed.

Determine the probability that 2 red jellybeans are chosen from a bag of 10 red jellybeans and 8 black jellybeans.

Yurak is shelving books in a display in the school library. He has four different books with three copies of each. In how many ways can he arrange the books on the shelf for display?

Melik has five quarters and six dimes in his pocket. He pulls out one coin. What is the probability it is a quarter?

In how many ways can all of the letters of the
MISSISSAUGA be arranged?

A combination lock opens when the right combination of three numbers from 00 to 99 is entered. The same number may be used more than once. What is the probability of getting the right combinations just by chance?

In how many ways can 10 students standing in a line be arranged if Jill must be first and Meera last?

How many arrangements of the word ALGORITHM begin with a vowel and end with a consonant?

You are taking a chemistry test and are asked to list the first 10 elements of the periodic table in order as they appear in the table. You know the first 10 elements, but not the order. What is the probability that you guess correctly?

How many 3 letter permutations of the word YELLOW are possible?

A sports team consists of 5 bowlers, 9 batsmen and 2 keepers. How many different teams of 11 players can be chosen from the above squad if the team consists of 4 bowlers, 6 batsman and 1 keeper?

Freda has a choice of 4 different carpets and 6 different wallpapers when she redecorates her room. In how many ways can she redecorate?

A vice principal wishes to interview 5 students individually to verify their stories. In how many ways can the students be ordered?

How many 4 number permutations of the numbers 1, 2, 3, 4, 5, 6 do not contain a 6?

A fish tank contains 5 gold coloured tropical fish and 8 black tropical fish. If 3 fish are scooped out at random, what is the probability that they are all gold coloured?