Pre-Calculus 12 Fundamental Counting Principle

Counting methods are used to determine the number of members of a specific set as well as the outcomes of an event. You can display all the possible choices using tables, lists or tree diagrams and then count the number of outcomes.

Ex. 1) A fan has three settings: off, low and high. Determine how many ways are there to set two fans using a tree diagram.

Fundamental Counting Principle

If there are n_1 different objects in one set and n_2 different objects in a second set, then the number of ways of choosing one object from each set is $n_1 n_2$

From example 1,

There are 3 ways to set the first fan and 3 ways to set the second fan so the total number of ways to set 2 fans is $3 \times 3 = 9$

Ex. 2) Determine how many ways a class president, vice-president and secretary can be selected from 30 students to form class council.

Ex. 3) For an online banking account the minimum security standards require a password to have two letters followed by five digits. All letters and numbers may be used more than once.

a) Determine the number of possible combinations

b) Determine the number of combinations there would be if repetition is not allowed.

Ex. 4) The final score in a soccer game is 5 to 4 for Team A. How many different half-time scores are possible?

Ex. 5) How many four-digit numbers are there with no repeated digits?

Ex. 6) How many odd four-digit numbers have no repeated digits?

Restrictions

Ex. 7) How many different 3-digit even numbers greater than 300 can be made using only the digits 1, 2, 3, 4, 5 and 6?

Ex. 8) How many even 4-digit numbers have no repeated digits?