

Notes 3.4 Counting Principles

I. Permutations

Example 1:

The objective of a 9 x 9 Sudoku number puzzle is to fill the grid so that each row, each column, and each 3 x 3 grid contain the digits 1 to 9. How many different ways can the first row of a blank 9 x 9 Sudoku grid be filled?

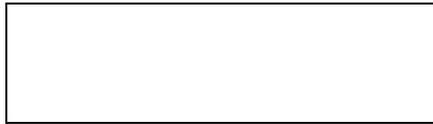
Try It Yourself 1:

The teams in the National League Central Division are listed below.

Chicago Cubs	Cincinnati Reds	Houston Astros
Milwaukee Brewers	Pittsburgh Pirates	St. Louis Cardinals

How many different final standings are possible?

Suppose you want to choose some of the objects in a group and put them in order. Such an ordering is called _____.



Example 2:

Find the number of ways of forming three-digit codes in which no digit is repeated.

Try It Yourself 2:

A psychologist shows a list of eight activities to her subject. How many ways can the subject pick a first, second, and third activity?

Example 3:

Forty-three race cars started the 2007 Daytona 500. How many ways can the cars finish first, second, and third?

Try It Yourself 3:

The board of directors for a company has twelve members. You are going to elect a president, vice-president, secretary and treasurer. How many ways can these positions be assigned?

You want to buy three DVDs from the selection below. List the possible combinations you can buy.

Field of Dreams *Remember the Titans* *Invincible* *Coach Carter* *Marshall*

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II. Combinations



Example 5:

A state 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?

Try It Yourself 5:

The manager of an accounting department wants to form a three-person advisory committee from the 20 employees in the department. In how many ways can the manager do this?

Example 6:

You have entered a race in which the top five finishing the race with advance to the next round. There are thirty people in the race. In how many ways can the top five racers finish?

III. Finding Probabilities

Example 7:

A student advisory board consists of 17 members. Three members serve as the board's chair, secretary, and webmaster. Each member is equally likely to serve any of the positions. What is the probability of selecting at random the three members that hold each position?

Example 8:

Find the probability of being dealt five diamonds from a standard deck of playing cards. (In poker, this is a diamond flush.)

Example 9:

A food manufacturer is analyzing a sample of 400 corn kernels for the presence of a toxin. In this sample, three kernels have dangerously high levels of the toxin. If four kernels are randomly selected from the sample, what is the probability that exactly one kernel contains a dangerously high level of the toxin?

Try It Yourself 9:

A jury consists of five men and seven women. Three are selected at random for an interview. Find the probability that all three are men.

Assignment:

In New Textbook: pgs 178 – 181/ 15, 16, 17, 19, 20, 21, 22, 23, 26, 28, 35 – 37, 49

In Old Textbook: pgs 140 – 141/ 5, 6, 7, 12, 13