

Section 6.4: Use of Counting Techniques in Probability

Some of the problems we will work will have very large sample spaces or involve multiple events. In these cases, we will need to use the counting techniques from the chapter 5 to help solve the probability problems. In particular, we'll work with the multiplication principle and combinations.

Let S be a sample space and let E be any event. Then $P(E) = \frac{n(E)}{n(S)}$

Example 1: Consider the experiment of tossing a fair coin 12 times.

a. Find the probability that the coin lands heads exactly three times?

b. Find the probability that the coin lands heads either 4 or 5 times.

c. Find the probability that the coin lands tails at least 11 times.

d. Find the probability that the coin lands heads at least twice.

Example 4: An urn contains 25 marbles of which 9 are green and 16 are blue. What is the probability that a person choosing 4 marbles at random will choose

a. Exactly 3 green and one blue?

b. At least 2 green marbles?

c. At most 1 blue marble?

Example 5: A class contains 30 students, 18 girls and 12 boys. A group of 5 students is chosen at random from the class to make a presentation to the school board. What is the probability that the group making the presentation is made up of

a. All boys?

b. More girls than boys?

c. At least 1 boy?