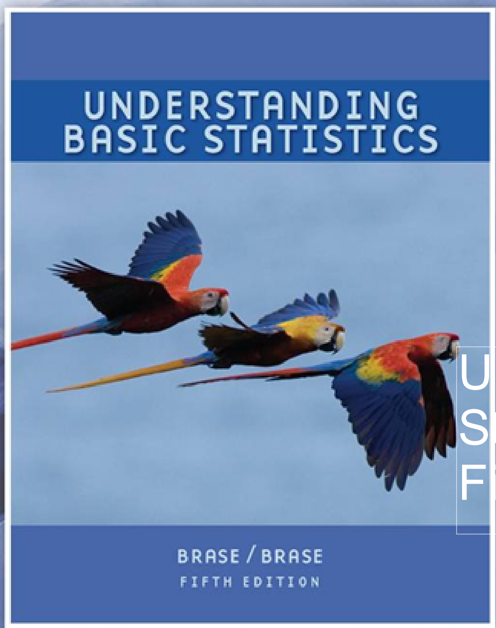
Login your clickers & yes calculators.

Have out:

1) quiz review
2) chapter 5 power point notes
3) 5.3 vocabulary

Login your answers for the review.

May 4-7:31 AM



Chapter 5

Elementary Probability Theory

Understanding Basic Statistics
Fifth Edition

Oct 15-10:59 AM

Multiplication Rule for Counting

Multiplication rule of counting

If there are n possible outcomes for event E_1 and m possible outcomes for event E_2, then there are a total of $n \times m$ or nm possible outcomes for the series of events E_1 followed by E_2.

This rule extends to outcomes involving three, four, or more series of events.

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1 Answer?

Multiplication Rule for Counting

Multiplication rule of counting

If there are n possible outcomes for event E_1 and m possible outcomes for event E_2, then there are a total of $n \times m$ or nm possible outcomes for the series of events E_1 followed by E_2.

A coin is tossed and a six-sided die is rolled. How many outcomes are possible?

$2 \cdot 6 =$

a). 8 b). 10 c). 12 d). 18

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Tree Diagrams

- Displays the outcomes of an experiment consisting of a sequence of activities.
- The total number of branches equals the total number of outcomes.
- Each unique outcome is represented by following a branch from start to finish.

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Tree Diagrams with Probability

- We can also label each branch of the tree with its respective probability.

- To obtain the probability of the events, we can multiply the probabilities as we work down a particular branch.

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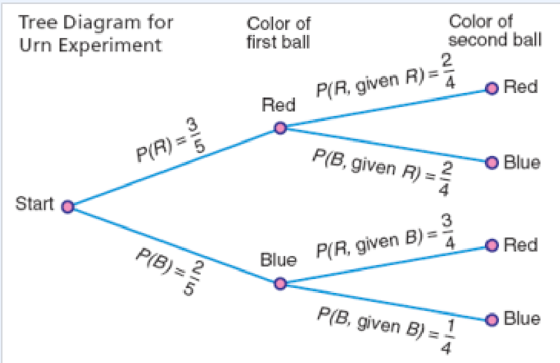
Urn Example

- Place five balls in an urn: three red and two blue. Select a ball, note the color, and, without replacing the first ball, select a second ball.



Four possible outcomes:
Red, Red
Red, Blue
Blue, Red
Blue, Blue

Probabilities are found by using the multiplication rule for dependent events.

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The Factorial

- $n! = (n)(n-1)(n-2)\ldots(2)(1)$, n a counting number
- By definition,
  $1! = 1$
  $0! = 1$

Example: $5! = 5 \cdot 4 \cdot 3 \cdot 2 \cdot 1 = 120$

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Permutations

- Permutation: ordered grouping of objects.
- Example Permutation:

  Seats 1 through 5 are occupied by Alice, Bruce, Carol, Dean, and Estefan, respectively.

Counting rule for permutations

The number of ways to *arrange in order n* distinct objects, taking them *r* at a time, is

$$P_{n,r} = \frac{n!}{(n-r)!} \qquad (9)$$

where n and r are whole numbers and $n \geq r$. Another commonly used notation for permutations is nPr.

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2 Answer?

Permutations

Prob.

Counting rule for permutations

The number of ways to *arrange in order n* distinct objects, taking them *r* at a time, is

Calc menu, 2, n, r

$$P_{n,r} = \frac{n!}{(n-r)!} \qquad (9)$$

where n and r are whole numbers and $n \geq r$. Another commonly used notation for permutations is nPr.

For a group of seven people, how many ways can four of them be seated in four chairs?

a). 35 b). 3 c). 28 d). 840

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Combinations

- A combination is a grouping that pays no attention to order.
- Example Combination:

  Out of a set of 20 people, Alice, Bruce, Carol, Dean, and Estefan are chosen to be seated.

Counting rule for combinations

The number of *combinations* of n objects taken r at a time is

$$C_{n,r} = \frac{n!}{r!(n-r)!} \qquad (10)$$

where n and r are whole numbers and $n \geq r$. Other commonly used notations for combinations include nCr and $\binom{n}{r}$.

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3 Answer?

Combinations

Counting rule for combinations

Prob.

The number of *combinations* of n objects taken r at a time is

$$C_{n,r} = \frac{n!}{r!(n-r)!} \qquad (10)$$

Menu, 3, n, r

where n and r are whole numbers and $n \geq r$. Other commonly used notations for combinations include nCr and $\binom{n}{r}$.

Among eleven people, how many ways can eight of them be chosen to be seated?

a). 6,652,800 b). 165

c). 3 d). 88

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