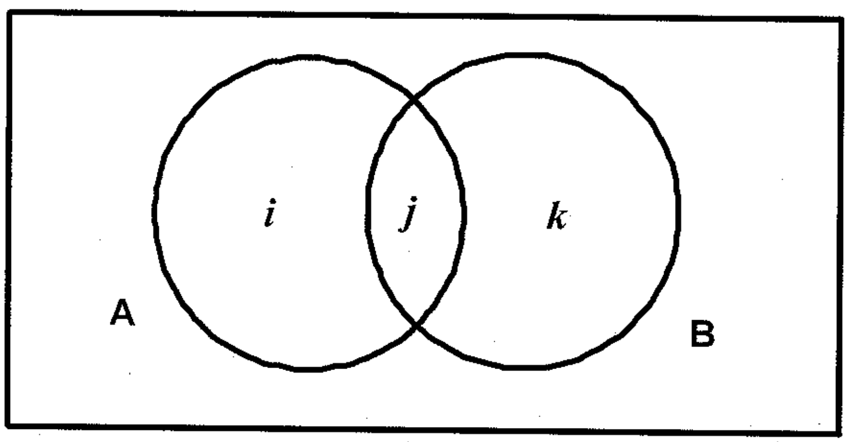
GENERAL ADDITION RULE

Outcome Space



n equally likely outcomes

Probability of $A = \frac{i+j}{n}$ Probability of $B = \frac{j+k}{n}$

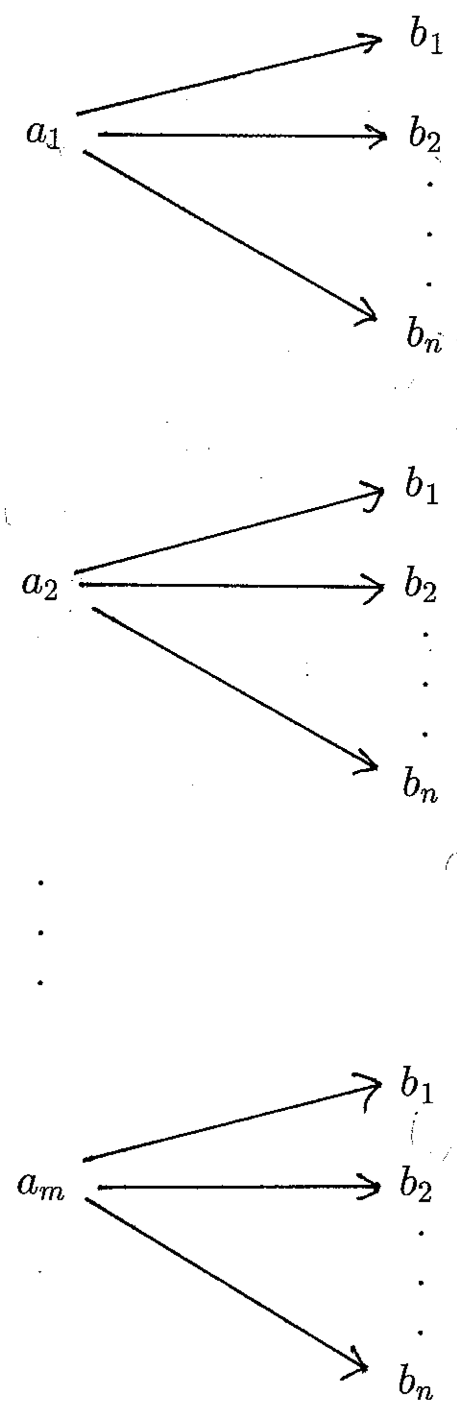
Probability of A *and* $B = \frac{j}{n}$

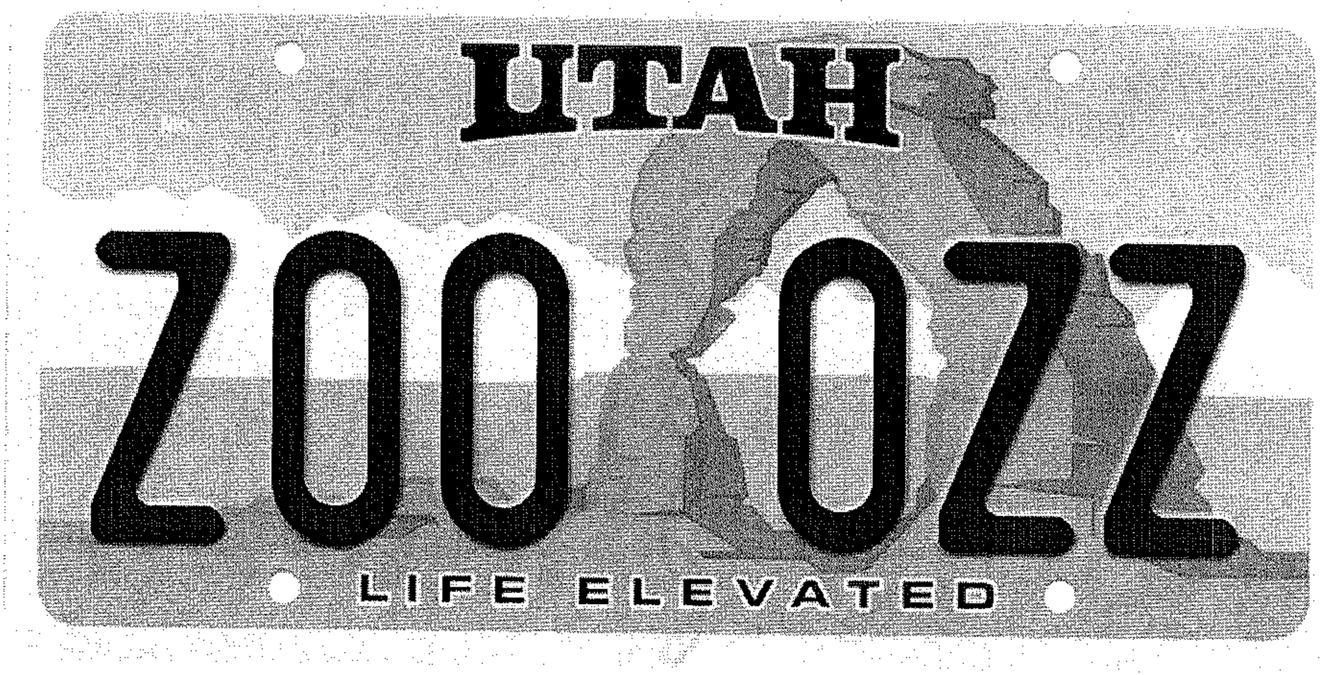
Probability of A *or* $B = \frac{i+j+k}{n} = \frac{i+j}{n} + \frac{j+k}{n} - \frac{j}{n}$

Probability of *A or B* = Probability of A + Probability of B − Probability of *A and B*

FUNDAMENTAL COUNTING PRINCIPLE:

If event A can occur in m different ways and, after event A has occurred, event B can occur in n different ways, then there are m · n possible ways for both events A and B to occur.





standard issue (1 version)

letter - number - number - number - letter - letter

(26)(10)(10)(10)(26)(26)

10 · 10 · 10 · 26 26 26

numbers letters

Stat 1040

1. For a class of size 25, how many ways can you select a president, vice president, and secretary?

2. For a class of size 25, how many ways can you select a committee of three students?

3. Given *n* objects, how many ways can you select *k* of them?

4. Given 13 different letters, how many ways can you select 5 of them and arrange them in order?

5. What is the chance of winning the lottery?

6. Deron Williams makes 80 % of his free throws. What is the chance that he will make exactly 3 out of 5 free throws? 12 or more out of 15?

Repeated Trials

1. From a class of 6 students, how many ways can you select a committee of size three?

2. From a class of 15 students, how many ways can you select a committee of size three?

3. How many ways can you fill in the blanks _ __ _ _ _ with exactly 3 H's and 2 T's?

4. Find the probability of getting exactly *3 heads* in five tosses of a fair coin.

Repeated Trials: Suppose we have n independent trials, and the probability that event E occurs in any given trial is p. Then the probability that E will occur exactly k times is

$$\frac{n!}{k!(n-k)!}p^k(1-p)^{n-k}$$

5. Find the probability of getting exactly *3 heads* in five tosses of a biased coin where the probability of heads is 1/3.

6. A multiple-choice test has 10 questions, each with four choices. You are able to eliminate one of the choices on each question and then guess from the remaining 3 choices. A passing grade is to get 8 or more of the questions correct. Find the chance that you pass.

Stat 1040

1. How many ways can you select k objects from among n objects?

$$\text{"n choose k"} = \binom{n}{k} = \frac{n!}{k!(n-k)!}$$

[Given n students, how many ways can you choose a committee of size k ?]

2. Four draws are made with replacement from the box [R , R , G , G , G . G , G] .

Find the probability that

a) a red ticket is never drawn

b) exactly 3 red tickets are drawn

c) exactly 4 green tickets are drawn

3. A coin will be tossed 10 times. Find the probability of getting

a) exactly 4 heads

b) exactly 5 heads

c) at least 2 heads

PROBABILITY RULES (The World)

Definition: The probability [chance] of event A is the proportion [percentage] of the time A is expected to happen when the random process is repeated over and over again.

Opposite Event Rule: The probability that event A happens is equal to one minus the probability that A doesn't happen.

Multiplication Rule: The probability that events A and B both happen is equal to the probability that A happens times the probability that B happens given that event A has occurred.

Definition: Two events are mutually exclusive when the occurrence of one prevents the occurrence of the other.

Addition Rule: The probability that event A or event B happens is equal to the probability that A happens plus the probability that B happens minus the probability that both happen. If events A and B are mutually exclusive, then the probability that event A or B happens is simply the sum of the probabilities.

Definition: Two events are independent if when one happens, the probability that the other happens is unchanged.

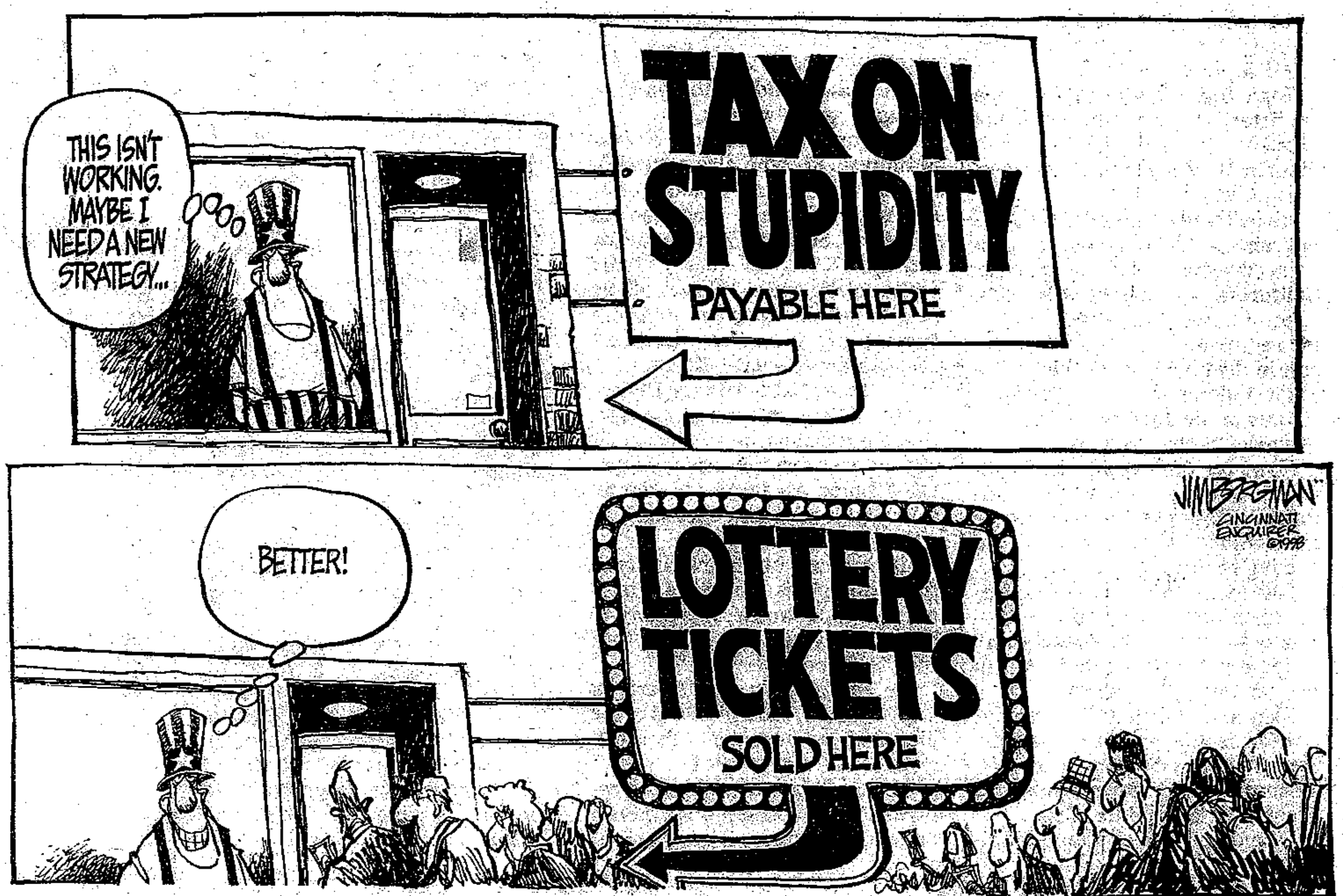
Fundamental Counting Principle: If event A can occur in m ways and after A occurs event B can occur in n ways, then the number of ways both events A and B can occur is m x n .

The number of ways k objects can be selected from n objects without regard to order is

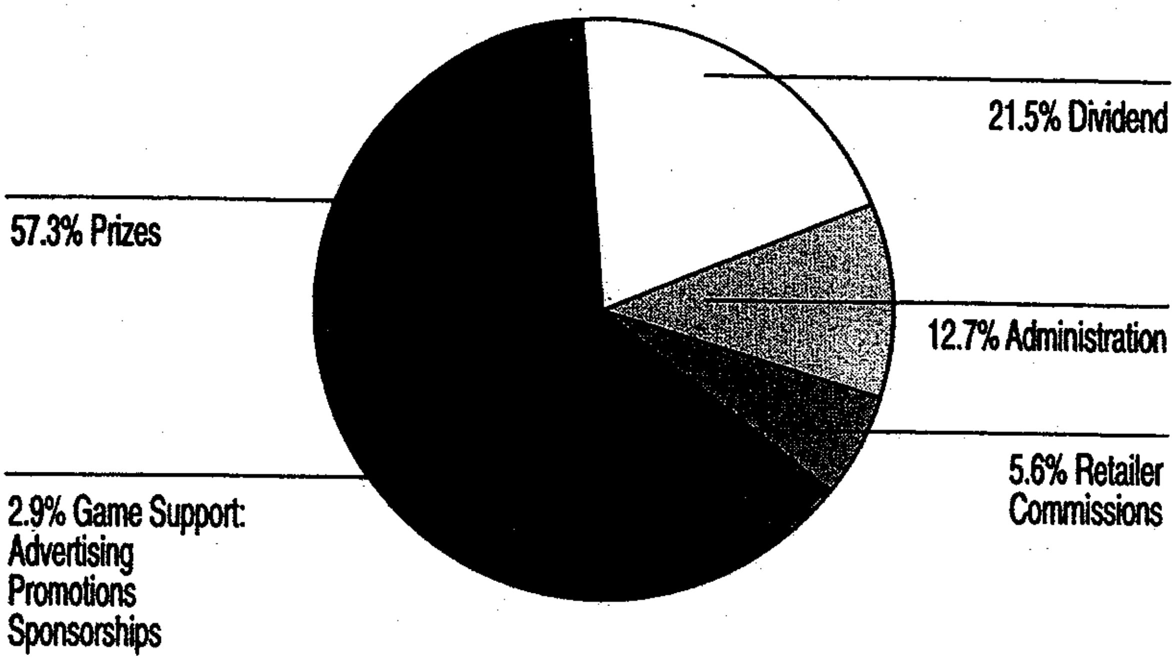
$$\binom{n}{k} = \frac{n!}{k!(n-k)!}$$

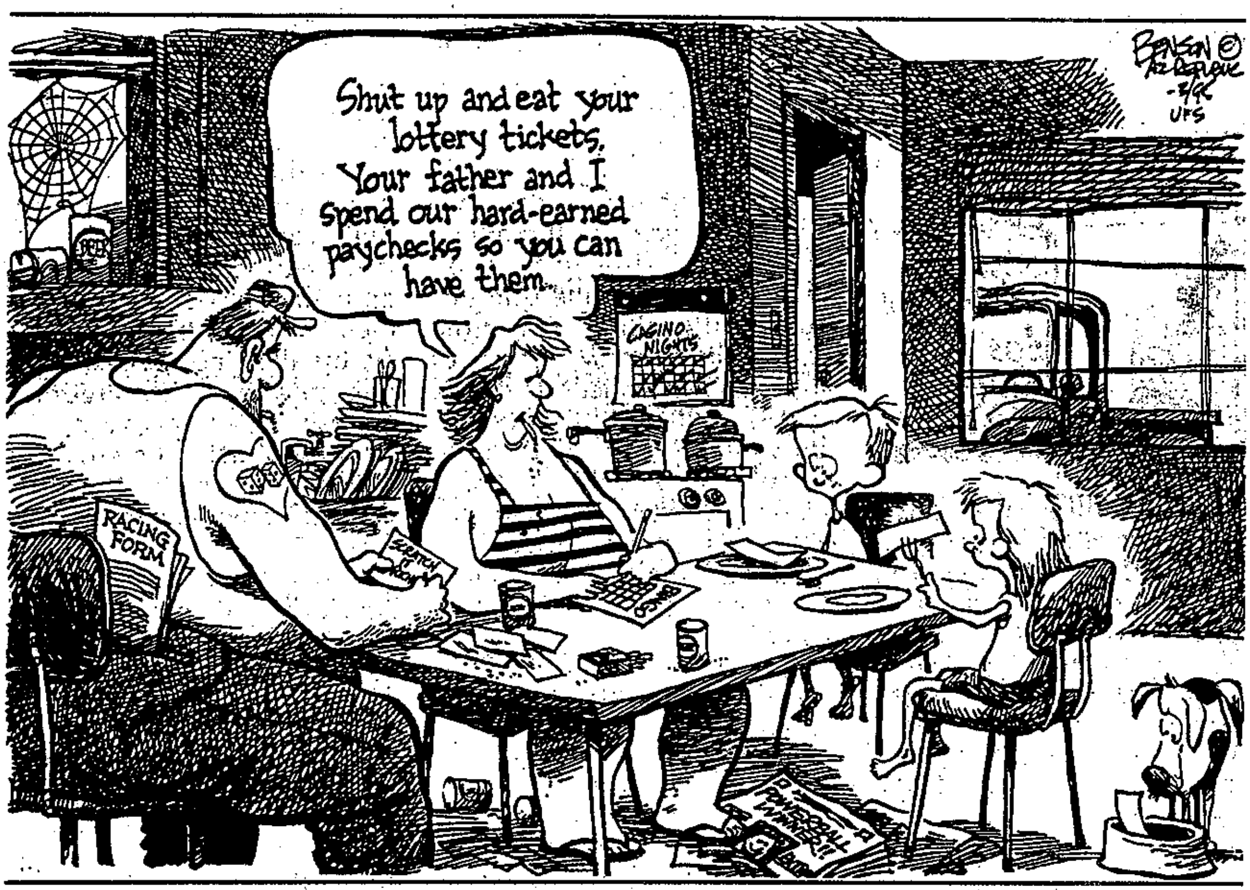
Repeated Trials: Suppose we have n independent trials, and the probability that event E occurs in an given trial is p. Then the probability that E will occur exactly k times is

$$\frac{n!}{k!(n-k)!}\, p^k (1-p)^{n-k}$$


THIS ISN'T WORKING. MAYBE I NEED A NEW STRATEGY...
TAX ON STUPIDITY
PAYABLE HERE
BETTER!
LOTTERY TICKETS
SOLD HERE
JIM BORGMAN
CINCINNATI ENQUIRER ©1998

EXPENDITURES BY STATUTORY CATEGORY




Shut up and eat your lottery tickets. Your father and I spend our hard-earned paychecks so you can have them.
CASINO NIGHTS
RACING FORM
BENSON ©


B.C.
WHERE DOES THE MONEY FROM YOUR LOTTERY GO?
TO EDUCATE OUR YOUTHS!
...BETTER WATCH IT, SPORT, IF THEY GET TOO SMART, THEY'LL FIGURE OUT THE ODDS.
LOTTERY
LOTTERY


Larson