

The Infinite Actuary Exam 1/P Online Seminar
A.1 The “Laws” of Probability Lecture Examples

A.1.1 Fundamentals of Probability

Slide 8/30.

[Variation on SOA #2; S00.01] The probability that a visit to a primary care physician's (PCP) office results in either lab work or referral to a specialist is 60%. Of those coming to a PCP's office, 35% are referred to specialists and 50% require lab work.

Determine the probability that a visit to a PCP's office results in both lab work and referral to a specialist.

Slide 9/30.

[Variation on SOA #8; F01.09] Among a large group of patients recovering from shoulder injuries, it is found that 25% visit both a physical therapist and a chiropractor, and 85% visit at least one of these. The probability that a patient visits a chiropractor exceeds by 0.20 the probability that a patient visits a physical therapist. Determine the probability that a randomly chosen member of this group visits a physical therapist.

Slide 13/30.

[Variation on SOA #1; S.03.01] A survey of a group's viewing habits found the following:

- (i) 31% watched gymnastics, 25% watched baseball, and 21% watched soccer
- (ii) 11% watched gymnastics and baseball, 8% watched baseball and soccer, and 9% watched gymnastics and soccer
- (iii) 5% watched all three sports.

Find the percentage of the group that watched none of the three sports.

Slide 15/30.

[SOA #15; S.01.31] An insurer offers a health plan to the employees of a large company. As part of this plan, the individual employees may choose exactly two of the supplementary coverages A, B, and C, or they may choose no supplementary coverage. The proportions of the company's employees that choose coverages A, B, and C are $\frac{1}{4}$, $\frac{1}{3}$, and $\frac{5}{12}$, respectively.

Determine the probability that a randomly chosen employee will choose no supplementary coverage.

Slide 19/30.

A survey of a group's viewing habits found the following:

- (i) 30% watched Fox News, 25% watched CNN, 10% watched MSNBC and 29% watched the Daily Show
- (ii) No one watched both Fox and MSNBC, and no one watched both CNN and the Daily Show.
- (iii) 13% watched only CNN, 26% watched only the Daily Show, but no one watched only MSNBC.

Find the percentage of the group that watched none of the four.

Slide 26/30.

An auto insurance company has 10,000 policyholders. Each policyholder is classified as

- (i) young or old; and
- (ii) male or female;

Of these policyholders, 2,000 are neither young nor male, and 6,000 are either young or female.

How many policyholders are young?

Slide 30/30.

[Variation on SOA #1; S.03.01] A survey of a group's viewing habits found the following:

- (i) 31% watched gymnastics, 25% watched baseball, and 21% watched soccer
- (ii) 11% watched gymnastics and baseball, 8% watched baseball and soccer, and 9% watched gymnastics and soccer
- (iii) 5% watched all three sports.

Find the percentage of the group that watched none of the three sports.