

Examples for Sec. 2.4

Example 1. (Example 2.26 on book)

A news magazine publishes three columns entitled “Art” (A), “Books” (B), and “Cinema” (C). Reading habits of a randomly selected reader with respect to these are

READ REGULARLY	A	B	C	$A \cap B$	$A \cap C$	$B \cap C$	$A \cap B \cap C$
PROBABILITY	.14	.23	.37	.08	.09	.13	.05

$$P(A|B) = ?$$

$$P(A|B \cap C) = ?$$

Example 2.

The letters of “HALIFAX” are dropped in a box and drawn one by one without replacement.

$$P(\text{letters drawn read as HALIFAX}) = ?$$

Example 3. (Only for those ones of you with big stomachs! Try it yourself!!)

A man possesses five coins, two of which are double-headed, one is doubled tailed, and two are normal. He shuts his eyes, picks a coin at random and tosses it.

- (1) What is the probability that the lower face is a head?
- (2) He opens his eyes and sees that the coin is showing heads. What is the probability that the lower face is a head?
- (3) He shuts his eyes again and tosses the coin. What is the probability that the lower face is a head?
- (4) He opens his eyes and sees that the coin is showing heads. What is the probability the lower face is a head?
- (5) He discards his coin, picks another at random and tosses it. What is the probability that it shows heads?

Example 4 (Ex. 2.29 on book)

A chain of video stores sells three different brands of VCRs. Of its VCR sales, 50% are brand 1, 30% are brand 2, and 20% are brand 3. Each manufacturer offers a 1-year warranty on parts and labor. It is known that 25% of brand 1’s VCRs require warranty repair work, whereas the corresponding percentages for brands 2 and 3 are 20% and 10% respectively.

1. What is the probability that a randomly selected purchaser has bought a brand 1 VCR that will need repair while under warranty?
2. What is the probability that a randomly selected purchaser has a VCR that will need repair while under warranty?
3. If a customer returns to the store with a VCR that needs warranty repair work, what is the probability that it is a brand 1 VCR? A brand 2 VCR? A brand 3 VCR?

Example 5 (Ex. 2.30) Incidence of a rare disease

Only 1 in 1000 adults is afflicted with a rare disease for which a diagnostic test has been developed. The test is such that when an individual actually has the disease, a positive result will occur 99% of the time, whereas an individual without the disease will show positive test result only 2% of the time. If a randomly selected individual is tested and the result is positive, what is the probability that the individual has the disease?

Example 6. (Example 2.33 on book)

Example 7. (Example 2.35 on book)