

Exercise 1:

In a process that manufactures aluminum cans, the probability that a can has a flaw on its side is 0.02, the probability that a can has a flaw on the top is 0.03, and the probability that a can has a flaw on both the side and the top is 0.01. Assume that a can is randomly chosen.

1. What is the probability that it has no flaw?
2. What is the probability that it has a flaw on the top but not on the side?
3. What is the probability that a randomly chosen can has at least one of these flaws but not both?

Exercise 2:

A paint-store chain produces and sells latex and semigloss paint. Based on long-range sales, the probability that a customer will purchase latex paint is 0.75. Of those that purchase latex paint, 60% also purchase rollers. But only 30% of semigloss paint buyers purchase rollers. A randomly selected buyer purchases a roller and a can of paint. What is the probability that the paint is latex?

Exercise 3:

Based on extensive testing, it is determined by the manufacturer of a washing machine that the time X (in years) before a major repair is required is characterized by the probability mass function

Percentage of machines	Time
10%	4 years
18%	5 years
53%	6 years
12%	7 years
7%	8 years

1. For a randomly chosen washing machine, what is the probability that the time before a major repair is required is more than its average?
2. Find and graph the cumulative distribution function of X .
3. If the time before a major repair is required is at most 7 years, what is the probability that a washing machine gets repaired between its 4-th and 6-th lifetime year?
4. Calculate $P((X - 4)^2 > 1)$.

Exercise 4:

Specifications call for the thickness of aluminum sheets that are to be made into cans to be between 8 and 11 thousandths of an inch. Assume the probability density function of X , the thickness of an aluminum sheet, is given by

$$g(x) = \frac{2x}{k^2}, \quad 0 \leq x \leq k.$$

Find the value of k such that $V(X + 2E(X)) = 2$.

Exercise 5:

Does a five-year old kid have a better chance of rearranging "accluus" to spell "calculus" or "aabegl" to spell "algebra"?

Gamma