Probability

Solved Example

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$$P(A \cup B) = P(A) + P(B) - P(A \cap B)$$

Example 01

- 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**. What is the probability that a randomly chosen can has a flaw? What is the probability that it has no flaw?

P(flaw on side) = 0.02

P(flaw on top) = 0.03

P(flaw on side and flaw on top) = 0.01

P(flaw on side or flaw on top) =

P(flaw on side) + P(flaw on top) − P(flaw on side and flaw on top)

= 0.02 + 0.03 − 0.01

= 0.04

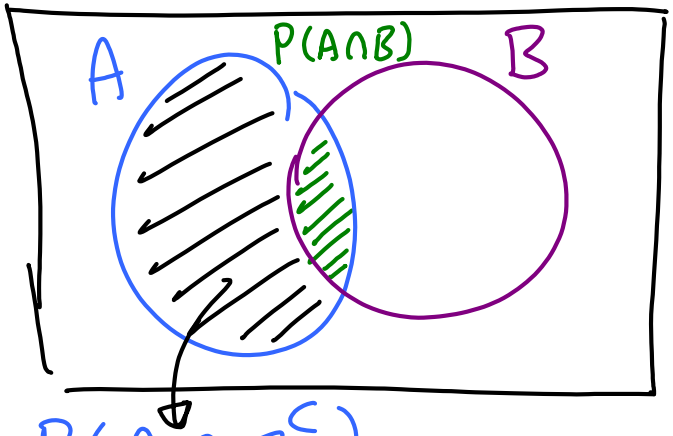
P(no flaw) = 1 − 0.04 = 0.96

Example 02

- Refer to Example 01 listed above. What is the probability that a can has a flaw on the top but not on the side?

A ⇒ flaw on top

B ⇒ flaw on Side



$P(A) = P(A \cap B) + P(A \cap B^c)$

$P(A - B)$

$P(A \cap B')$

$= P(A) - P(A \cap B)$

$= 0.03 - 0.01$

$= \boxed{0.02}$

References

- Understanding Boxplots https://towardsdatascience.com/understanding-boxplots-5e2df7bcbd51
- What does a box plot tell you? https://www.simplypsychology.org/boxplots.html
- Statistics for Engineers and Scientists, Fourth Edition, William Navidi Colorado School of Mines
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