Elementary Statistics: Math 080

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Unit 0 Outline

1. Topics from Chapter 1: 1.1, 1.2, 1.3
    - What is a statistic?
    - Probability examples
    - Data and sampling
2. Topics from Chapter 2: 2.1 - 2.4, 2.5 - 2.8
    - Data visualization
    - Location of the data in numerical space
3. Topics from Chapter 3: 3.1, 3.2, 3.3
    - Two rules of probability

Topics from Chapter 3

Two Rules of Probability

The Multiplication Rule: If A and B are *independent* events, then the probability

$$P(A \; AND \; B) = P(A)P(B) \tag{1}$$

The Addition Rule: If A and B are *mutually exclusive* events, then the probability

$$P(A \; OR \; B) = P(A) + P(B) \tag{2}$$

Independent means knowledge that one event occurred does not change the probability of another event. *Mutually exclusive* means that the events cannot occur at the same time.

Two Rules of Probability

The Multiplication Rule: Example with coins.

The Addition Rule: Example with coins.

Two Rules of Probability

Suppose you deal 4 cards from a 52 card playing deck (with four suits of 12 cards each) without replacing the cards. What is the probability of obtaining four aces?

- A: 1 in 100
- B: 1 in 2700
- C: 1 in one million
- D: 1 in 270,000

Two Rules of Probability

Suppose you deal 4 cards from a 52 card playing deck (with four suits of 12 cards each) without replacing the cards. What is the probability of obtaining two hearts and two diamonds (any number for each)?

- A: 1 in 10
- B: 1 in 33
- C: 1 in 270
- D: 1 in 3500

Two Rules of Probability

Suppose you deal 1 card from a 52 card playing deck (with four suits of 12 cards each) without replacing the card. What is the probability of obtaining a heart or a diamond?

- A: 1 in 6
- B: 1 in 3
- C: 1 in 2
- D: 1 in 30

Conclusion

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