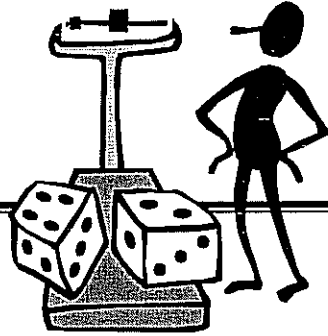


Chapter 14: From Randomness to Probability



Key Vocabulary:

- probability
- trial
- outcome
- event
- independent
- Law of Large Numbers
- complement
- disjoint
- mutually exclusive

1. In statistics, what is meant by the term *random*?
2. In statistics, what is meant by *probability*?
3. What does it mean for trials to be *independent*?
4. How is the *Law of Large Numbers* related to probability?
5. In statistics, what is an *event*?
6. Explain why the probability of any *event* is a number between 0 and 1.
7. What is the sum of the probabilities of all possible *outcomes*?
8. Describe the probability that an *event* does not occur?
9. What is meant by the *complement* of an event?
10. When are two events considered *disjoint*?
11. What is the probability of two *disjoint* events?
12. What is the *Multiplication Rule* for *independent* events?

13. Can *disjoint* events be *independent*?

14. If two events A and B are *independent*, what must be true about A^c and B^c ?

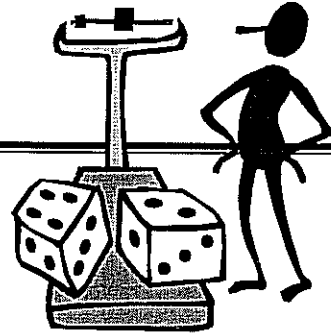
15. What is meant by the *union* of two or more events? Draw a diagram.

16. State the addition rule for *disjoint* events.

17. What is meant by the *intersection* of two or more events? Draw a diagram.

18. Explain the difference between the *union* and the *intersection* of two or more events.

Chapter 15: Probability Rules!



Key Vocabulary:

- trial
- outcome
- event
- sample space
- disjoint
- mutually exclusive
- independent
- conditional probability
- tree diagram

1. If events A and B are *disjoint*, then $P(A \cup B) = P(A) + P(B)$. If events A and B are NOT *disjoint*, explain why this formula does not work.

2. In general (whether events are *disjoint* or not), what is the formula for finding $P(A \cup B)$?

3. Explain the difference between the *Addition Rule* for *disjoint events* and the *General Addition Rule*.

4. What is meant by *joint probability*?

5. What is meant by *conditional probability*?

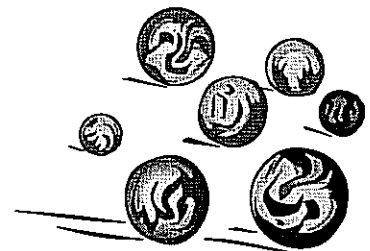
6. State the formula for finding *conditional probability*.

7. Is the probability of “A given B” the same as the probability of “B given A?” Explain.

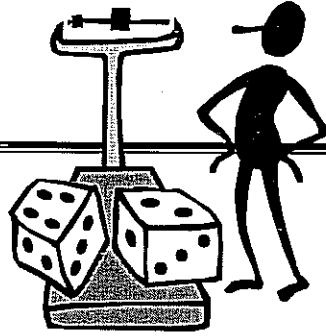
8. In general (whether events are *independent* or not), what is the formula for finding $P(A \cap B)$?

9. Explain the difference between the *Multiplication Rule* for *independent events* and the *General Multiplication Rule*.

10. State the formula used to determine whether or not two events are *independent*.



Chapter 16: Random Variables



Key Vocabulary:

- random variable
- discrete random variable
- continuous random variable
- standard deviation
- expected value
- $E(X)$
- $V(X)$

Calculator Skills:

- 1-VarStats L_1, L_2

1. What is meant by a random variable?
2. Explain the difference between a discrete random variable and a continuous random variable.
3. What information does a probability model give?
4. What is the expected value of a random variable?
5. How do you calculate the expected value of a random variable?
6. Explain the difference between the notations \bar{x} and μ_x .
7. Suppose $\mu_x = 5$ and $\mu_y = 10$. According to the rules for means, what is μ_{x+y} ?
8. Suppose $\mu_x = 2$. According to the rules for means, what is μ_{3+4x} ?

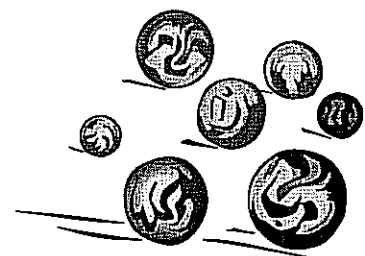
9. Explain how to calculate the variance of a discrete random variable X using the formula

$$\sigma_X^2 = \sum (x_i - \mu_X)^2 p_i.$$

10. Given the variance of a random variable, explain how to calculate the standard deviation.

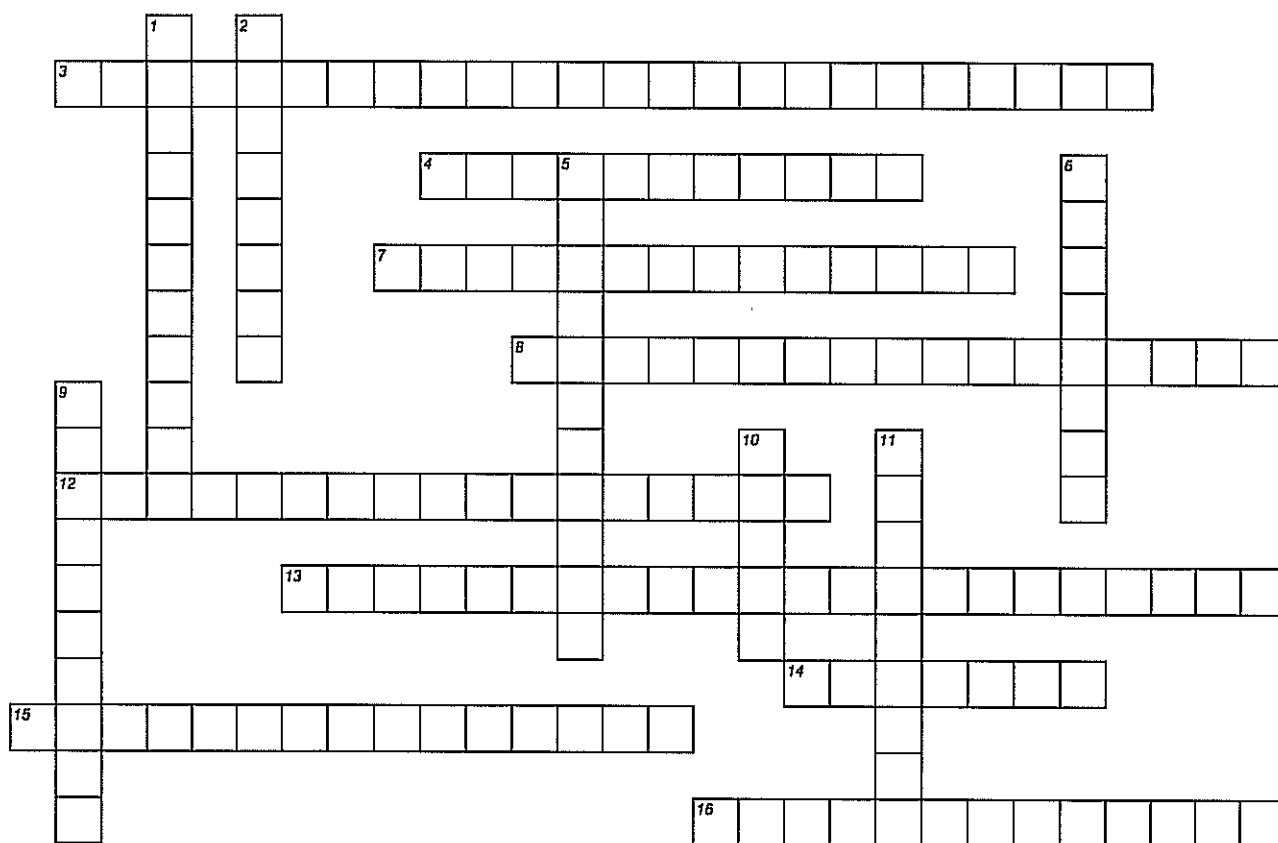
11. Suppose $\sigma_X^2 = 2$ and $\sigma_Y^2 = 3$ and X and Y are independent random variables. According to the rules for variances, what is σ_{X+Y}^2 ? What is σ_{X+Y} ?

12. Suppose $\sigma_X^2 = 4$. According to the rules for variances, what is σ_{3+2X}^2 ? What is σ_{3+2X} ?



Randomness & Probability

Advanced Placement Statistics



Stats: Modeling the World, Chapters 14-17

ACROSS

- 3 random variable that can take any numeric value within a range of values
- 4 collection of all possible outcome values
- 7 variable that assumes any of several different values as a result of some random event
- 8 the long-run relative frequency of repeated independent events settles down the true relative frequency as the number of trials increases
- 12 disjoint
- 13 random variable that can take one of a finite number of a distinct outcome
- 14 value measured, observed, or reported for an individual instance for a trial
- 15 situation where there are two possible outcomes, the probability of success is constant, and the trials are independent
- 16 the theoretical long-run average value

DOWN

- 1 relationship between events if knowing one event occurs does not alter the probability that the other event occurs
- 2 relationship between two events if they share no outcomes in common
- 5 a number between 0 and 1 that reports the likelihood of an event's occurrence
- 6 probability model appropriate for a random variable that counts the number of successes in a fixed number of Bernoulli trials
- 9 set of outcomes that are not in the specified event
- 10 collection of outcomes
- 11 probability model appropriate for a random variable that counts the number of Bernoulli Trials until the first success.