

Advanced Algebra Chapter 12 Outline

12-1

6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 22, 23, 25, 26, 27 (20)

12-2

12, 14, 16, 18, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 36, 39, 40, 44, 45 (20)

12-3

19, 20, 21, 22, 24, 26, 28, 30, 31, 32, 34, 36, 42, 44, 50, 51, 52, 53, 65, 70, 71, 72, 73, 74 (24)

12-4

14, 16, 18, 20, 22, 26, 28, 30, 31, 32, 33, 34, 45, 52, 53, 54, 56, 57 (18)

Quiz on 12-1, 12-2, and 12-3

12-5

14, 16, 18, 20, 23, 24, 25, 26, 27, 28, 30, 38, 40, 49, 51, 53, 55, 56 (21)

12-6

17, 18, 19, 20, 21, 22, 23, 27, 28, 29, 30, 40, 41, 45, 46, 47, 48 (19)

Wksts on 12-4, 12-5, 12-6

→ skip??

Quiz on 12-4, 12-5, and 12-6

Review P.688-692 8-26 all

Review P.693 1-22, skip 16, 17, 19-21

Chapter 12 Test

12-1 The Counting Principle**Outcome:****Sample Space:****Independent Events:**

Example 1: A menu has: Bread: white, wheat, rye
Spread: butter, mustard, mayo

How many different combinations?

Fundamental Counting Principle:**Example 1 Revisited:**

Example 2: Kim won a contest. The prize was a restaurant gift card and tickets to a game. There were 3 restaurant choices and tickets for either a football, baseball, basketball or hockey game. How many different ways to select a restaurant and then a game?

Example 3: Many answering machines have codes to get your messages. How many codes possible for a 3-digit code? 4-digit code?

Dependent Events: The outcome of one event does affect the outcome of another.

Example 4: Mary wants to take 6 different classes next year. Assuming that each class is offered each period, how many schedules could she have?

12-2 Permutations and Combinations

Permutations: When a group of objects are in a certain order and order **DOES** matter. (telephone numbers)

$$P(n, r) =$$

Example 1: Eight people entered a pie contest. How many ways can blue, red, and white be awarded?

Example 2: There are 10 finalists in a skating competition. How many ways can gold, silver, and bronze be awarded?

Permutations with Repetitions:

Example 3: How many different (distinguishable) ways to arrange letters of Mississippi?

Combinations: Order is NOT important. (committee members)

$$C(n, r) =$$

Example 4: Twenty people are at a birthday party. Three people need to pick up the pizza. How many ways to choose the people?

Example 5: Six cards are drawn from a deck of cards. How many hands consist of two hearts and four spades?

Example 6: Seven students in a group and 2 students need to present their project. How many ways can the students be chosen?

Example 7: Five cards are drawn from a deck of cards. How many hands consist of 3 clubs and 2 diamonds?

12-3 Probability

Probability =

Ex1. When two coins are tossed, what is the probability that both are tails?

Ex2. Monica has a collection of 32 CDs- 18 R&B and 14 rap. As she is leaving for a trip, she randomly chooses 6 CDs to take with her. What is the probability that she selects 3 R&B and 3 rap?

Ex3. According to the U.S. National Center for Health Statistics, the chances of a male born in 1990 living to be at least 65 years of age are about 3 in 4. For females, the chances are 17 in 20.

- A. What are the odds of a male living to be at least 65?
- B. What are the odds of a females living to be at least 65?

Ex4. When three coins are tossed, what is the probability that all three are heads?

Ex5. Roman has a collection of 26 books- 16 are fiction and 10 are nonfiction. He randomly chooses 8 books to take with him on vacation. What is the probability that he chooses 4 nonfiction and 4 fiction?

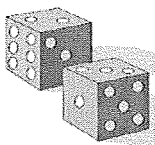
Ex6. Using the statistics in Example 3, what are the odds that a male born in 1990 will die before age 65? A female born in 1990?

12-4 Multiplying ProbabilitiesProbability of Two Independent Events

If two events, A and B, are independent, then the probability of both events occurring is $P(A \text{ and } B) = P(A) \times P(B)$.

Ex1. At a picnic, Julio reaches into an ice-filled cooler containing 8 regular soft drinks and 5 diet soft drinks. He removes a can, then decides he is not really thirsty, and puts it back. What is the probability the Julio and the next person to reach into the cooler both randomly select a regular soft drink?

Ex2. In a board game, three dice are rolled to determine the number of moves for the players. What is the probability that the first die shows a 6, the second die shows a 6, and the third die does not?

Probability of Two Dependent Events

If two events, A and B, are dependent, then the probability of both events occurring is

$$P(A \text{ and } B) = P(A) \times P(B \text{ following } A).$$

Ex3. The host of a game show is drawing chips from a bag to determine the prizes for which contestants will play. Of the 10 chips in the bag, 6 show television, 3 show vacation, and 1 shows car. If the host draws the chips at random and does not replace them, find each probability.

- a. a vacation, a car
- b. two televisions

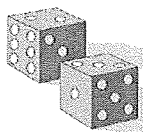
Ex4. Three cards are drawn from a standard deck of cards without replacement. Find the probability of drawing a diamond, a club, and another diamond in that order.



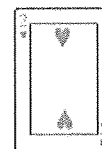
Ex5. Gerardo has 9 dimes and 7 pennies in his pocket. He randomly selects one coin, looks at it, and replaces it. He then randomly selects another coin. What is the probability that both of the coins he selects are dimes?



Ex6. When three dice are rolled, what is the probability that two dice show a 5 and the third die shows an even number?



Ex7. Three cards are drawn from a standard deck of cards without replacement. Find the probability of drawing a heart, another heart, and a spade in that order.



12-5 Adding Probabilities

Simple event: An event that consists of only one event.

Compound event: An event that consists of two or more simple events.

Mutually exclusive events: Two events cannot occur at the same time.

Probability of Mutually Exclusive Events

If two events, A and B, are mutually exclusive, then the probability that A and B occurs is the sum of their probabilities. $P(A \text{ or } B) = P(A) + P(B)$

Ex1. Keisha has a stack of 8 baseball cards, 5 basketball cards, and 6 soccer cards. If she selects a card at random from the stack, what is the probability that it is a baseball or a soccer card?

Ex2. There are 7 girls and 6 boys on the junior class homecoming committee. A subcommittee of 4 people is being chosen at random to decide the theme for the class float. What is the probability that the subcommittee will have at least 2 girls?

Ex3. Sylvia has a stack of playing cards consisting of 10 hearts, 8 spades, and 7 clubs. If she selects a card at random from this stack, what is the probability that it is a heart or a club?

Ex4. The Film Club makes a list of 9 comedies and 5 adventure movies they want to see. They plan to select 4 titles at random to show this semester. What is the probability that at least two of the films they select are comedies?

Inclusive events: Two events whose outcomes may be the same.

Probability of Inclusive Events

If two events, A and B, are inclusive, then the probability that A or B occurs is the sum of their probabilities decreased by the probability of both occurring.

$$P(A \text{ or } B) = P(A) + P(B) - P(A \text{ and } B)$$

Ex5. The enrollment at Southburg High School is 1400. Suppose 550 students take French, 700 take algebra, and 400 take both French and algebra. What is the probability that a student selected at random takes French or algebra?

Ex6. There are 2400 subscribers to an Internet service provider. Of these, 1200 own Brand A computers, 500 own Brand B, and 100 own both A and B. What is the probability that a subscriber selected at random owns either Brand A or Brand B?

12-6 Statistical Measures

Univariable Data: Data with one variable.

Measure of Central Tendency: Represents the center or middle of the data.

Mean: Use when the data are spread out, and you want an average of the values.

Median: Use when the data contain outliers.

Mode: Use when the data are tightly clustered around one or two values.

Ex1. A sweepstakes offers a first prize of \$10,000, two-second prizes of \$100, and one hundred third prizes of \$10.

a. Which measure of central tendency best represents the available prizes?

b. Which measure of central tendency would the organizers of the sweepstakes be most likely to use in their advertising?

Ex2. A new Internet company has 3 employees who are paid \$300,000, 10 who are paid \$100,000, and 60 who are paid \$50,000.

a. Which measure of central tendency best represents the pay at this company?

b. Which measure of central tendency would recruiters for this company be most likely to use to attract job applicants?

Measures of variation or dispersion measure how spread out or scattered a set of data is. The simplest measure of variation to calculate is the range, the difference between the greatest and least values in a set of data. Variance and standard deviation are measures of variation that indicate how much the data values differ from the mean.

To find the variance of data, follow these steps.

1. Find the mean
2. Find the difference between each value in the set of data and the mean.
3. Square each difference.
4. Find the mean of the squares.

The standard deviation is the square root of the variance.

Standard Deviation--There is a complicated formula and we are not going to learn it. Instead you will do it the way described above :)

Ex 3. This table shows the length in thousands of miles of some of the longest rivers in the world. Find the standard deviation for these data.

<u>River</u>	<u>Length</u> (thousands of miles)
Nile	4.16
Amazon	4.08
Missouri	2.35
Rio Grande	1.90
Danube	1.78