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Required Resources

Textbook: *Introduction to Cryptography With Coding Theory*

Read the following chapters and sections from the textbook:

- Chapter 3 through section 3.7: Primitive Roots
- Chapter 4 through section 4.4: Perfect Secrecy of the One-Time Pad

Modern cryptographic techniques convert messages into numbers which are then encrypted using various mathematical operations. The reading this week introduces basic concepts from an area of mathematics called number theory that form the essential mathematical groundwork for subsequent material studied in the course. The concept of a one-time pad is also introduced and studied. A one-time pad is an encryption technique that involves the use of a randomly generated key of the same length as the original message. This key should only be used once and must be kept completely secret, making it theoretically unbreakable if implemented correctly.

Video: The Integers Modulo n ⎆ (https://www.youtube.com/watch?v=Tl9Xxdoeg7I)
This video from Grand Valley State University explains the concept of congruence of integers modulo n.
Students may experience varying amounts of time for this resource to load, depending on the speed of their internet connection. This video is 6 minutes and 39 seconds in length.

Video: Modular Arithmetic ⎆ (https://www.youtube.com/watch?v=liNgbAG3CXM)
This video from Grand Valley State University explains the arithmetic of integers modulo n.
Students may experience varying amounts of time for this resource to load, depending on the speed of their internet connection. This video is 11 minutes and 6 seconds in length.

Video/Webpage: Independent and Dependent Probability ⎆
(https://www.khanacademy.org/math/statistics-probability/probability-library/multiplication-rule-dependent/v/independent-events-1) (2:38)
The Khan Academy site provides video tutorials on basic probability. Watch these and answer the simple test questions for immediate feedback on your understanding.

Video: Binary Numbers ⎆ (https://www.youtube.com/watch?v=ry1hpm1GXVI) (10:33)
This video describes how to convert numbers in base 10 to numbers in base 2.

A captioned version of this video is available: Binary Numbers (CC). ☑
(https://urldefense.com/v3/__https:/youtu.be/DG-
OzlUmJGE__;!!BeImMA!6NM70EpqFC4M0YQE6tXH2BfFqPKy8ENRMLn2qAQahtHv8n_s5_QjkceK5
ZPMNAH01ARN89mEloahYq4h6b1hsHZV6ZQf$)

A video transcript is available: Transcript for Binary Numbers ☑
(https://snhu.sharepoint.com/:w:/r/sites/LearningScienceAssessment/_layouts/15/Doc.aspx?
sourcedoc=%7B84496B75-0900-4377-A19B-
9083C3DFDDC8%7D&file=MAT%20260%20Transcript%20for%20Binary%20Numbers.docx&action
=default&mobileredirect=true)

Video: Fermat's Little Theorem ☑ (https://www.youtube.com/watch?v=w0ZQvZLx2KA) (10:34)
This video discusses Fermat's little theorem on exponentiation modulo p.

A captioned version of this video is available: Fermat's Little Theorem (CC). ☑
(https://urldefense.com/v3/__https:/youtu.be/uQhDxiMzJe0__;!!BeImMA!6NM70EpqFC4M0YQE6tX
H2BfFqPKy8ENRMLn2qAQahtHv8n_s5_QjkceK5ZPMNAH01ARN89mEloahYq4h6b1hsMl2zNJu$)

A video transcript is available: Transcript for Fermat's Little Theorem ☑
(https://snhu.sharepoint.com/:w:/r/sites/LearningScienceAssessment/_layouts/15/Doc.aspx?
sourcedoc=%7B9DD27DC0-BA3F-47CC-A8E2-
95D9E9F0F281%7D&file=MAT%20260%20Transcript%20for%20Fermat%27s%20Little%20Theore
m%20Number%20Theory.docx&action=default&mobileredirect=true)