

Unit 8 Exponential Functions

Algebra I

5 Weeks

Essential Questions
• How can you simplify expressions involving exponents? • What characterizes exponential growth and decay? • What are real world models of exponential growth and decay? • How can one differentiate an exponential model from a linear model given a real world set of data?

Enduring Understandings
1. Exponents are used to represent complex expressions. 2. Linear functions have a constant difference, whereas exponential functions have a constant ratio. 3. Real world situations can be represented symbolically and graphically.

Content	
Topics (Pearson): (7-1) Zero and Negative Exponents (7-2) Multiplying Powers with the Same Base (7-3) Multiplication Properties of Exponents (7-4) Division Properties of Exponents (7-5) Rational Exponents and Radicals (7-6) Exponential Functions (7-7) Exponential Growth and Decay	Students will know... • Properties of exponents • Scientific Notation • Exponential Functions • Exponential Growth • Exponential Decay

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21st Learning Expectations

Students will be able to...

- Employ mathematical problem solving skills effectively.
- Make decisions and solve problems in independent and collaborative settings.

21st Century Learning Skills

Students will be able to...

- ML #1 – Make sense of problems and persevere in solving them.
- ML #4 – Model with mathematics.
- ML #6 – Attend to precision.

Connecticut State Standards

CCSS

- N-RN 1. Explain how the definition of the meaning of rational exponents follows from extending the properties of integer exponents to those values, allowing for a notation for radicals in terms of rational exponents.
- N-RN 2. Rewrite expressions involving radicals and rational exponents using the properties of exponents.
- A-SSE 1b. Interpret complicated expressions by viewing one or more of their parts as a single entity.
- A-SSE 3c. Use the properties of exponents to transform expressions for exponential functions.
- F-IF 7e. Graph exponential functions, showing intercepts and end behavior.
- F-IF8b. Use the properties of exponents to interpret expression for exponential functions.
- F-BF 2. Write geometric sequences both recursively and with an explicit formula, use them to model situations, and translate between the two forms.
- F-LE 1c. Recognize situations in which a quantity grows or decays by a constant percent rate per unit interval relative to another.
- F-LE2 Construct linear and exponential functions, including arithmetic and geometric sequences, given a graph, a description of a relationship, or two input-output pairs.
- F-LE 2. Observe using graphs and tables that a quantity increasing exponentially eventually exceeds a quantity increasing linearly.
- F-LE 5. Interpret the parameter in an exponential function in terms of context.

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Objectives
Students will be able to... • Evaluate exponential expressions for a given value of the variable. • Apply the properties of exponents to simplify expressions. ◦ Use zero and negative exponents, multiplication properties exponents, and division properties of exponents. • Apply the properties of exponents to simplify and solve problems using scientific notation. • Evaluate exponential functions for a given domain. • Identify and graph exponential functions. • Identify the growth or decay factor for a given exponential function; write exponential functions for a given situation and use them to solve problems.

Assessments
Quiz EU1 – Simplifying Exponential Expressions Quiz EU2 – Identifying Exponential Functions Quiz EU3 – Graphing Exponential Functions Unit Test – Exponential Functions

Resources
Pearson – Algebra I Textbook TI-83 or TI-84