Exponential Growth and Exponential Functions

Summary

Students will model exponential growth and explore graphing exponential functions through transformations.

Main Core Tie

Secondary Mathematics I

Strand: FUNCTIONS - Building Linear or Exponential Functions (F.BF) Standard F.BF.3

Additional Core Ties

Secondary Mathematics I

Strand: FUNCTIONS - Building Linear or Exponential Functions (F.BF) Standard F.BF.1

Time Frame

2 class periods of 90 minutes each

Group Size

Small Groups

Life Skills

Thinking & Reasoning, Communication

Background for Teachers

This lesson is broken into two parts.

Part I requires students to fit an exponential model to a specific situation. They explore the domain and range of this model.

Part II leads students to draw conclusions about transformations of exponential functions.

Student Prior Knowledge

Students need to know how to graph ordered pairs, basic properties of exponents, and be able to recognize function notation.

Intended Learning Outcomes

The numbers below correspond to the Intended Learning Outcomes from the secondary math core.

2. Become proficient problem-solvers by posing appropriate questions, selecting appropriate methods, employing a variety of strategies, and exploring alternative approaches.

3. Think logically, using inductive reasoning to formulate reasonable conjectures and using deductive reasoning for justification, formally or informally.

4. Cooperatively and independently explore mathematics, using inquiry and technological skills.

6. Communicate mathematics through writing, modeling, and visualizing, using precise mathematical

language and symbolic notation.

Instructional Procedures

The worksheet provided can serve as the introduction to modeling and graphing exponential functions. It is not expected that students will have been taught any specifics about exponential functions or their graphs.

The lesson starts with students receiving copies of the worksheet. The teacher should help the students understand the situation described in Part I. Students should then be able to work together in small groups to complete Part I of the worksheet. A discussion should be held once Part I is complete. Make sure to discuss the equations students used to model the situation, as this is a fundamental idea for Part II.

The "Exponential Transformations" web site below provides an applet where students can change the values of a, b, h, and k and see what effect this has on an equation. They can use this to help them graph the functions, or they can graph the functions by filling in the table.

Authors

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