Growth and Decay (Part 1)

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Goals:

- Be familiar with applications of the exponential function.
- Convert other exponential bases to the natural base.
- Apply the exponential function to problem-solving in growth and decay settings.

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Why?

AI continues...

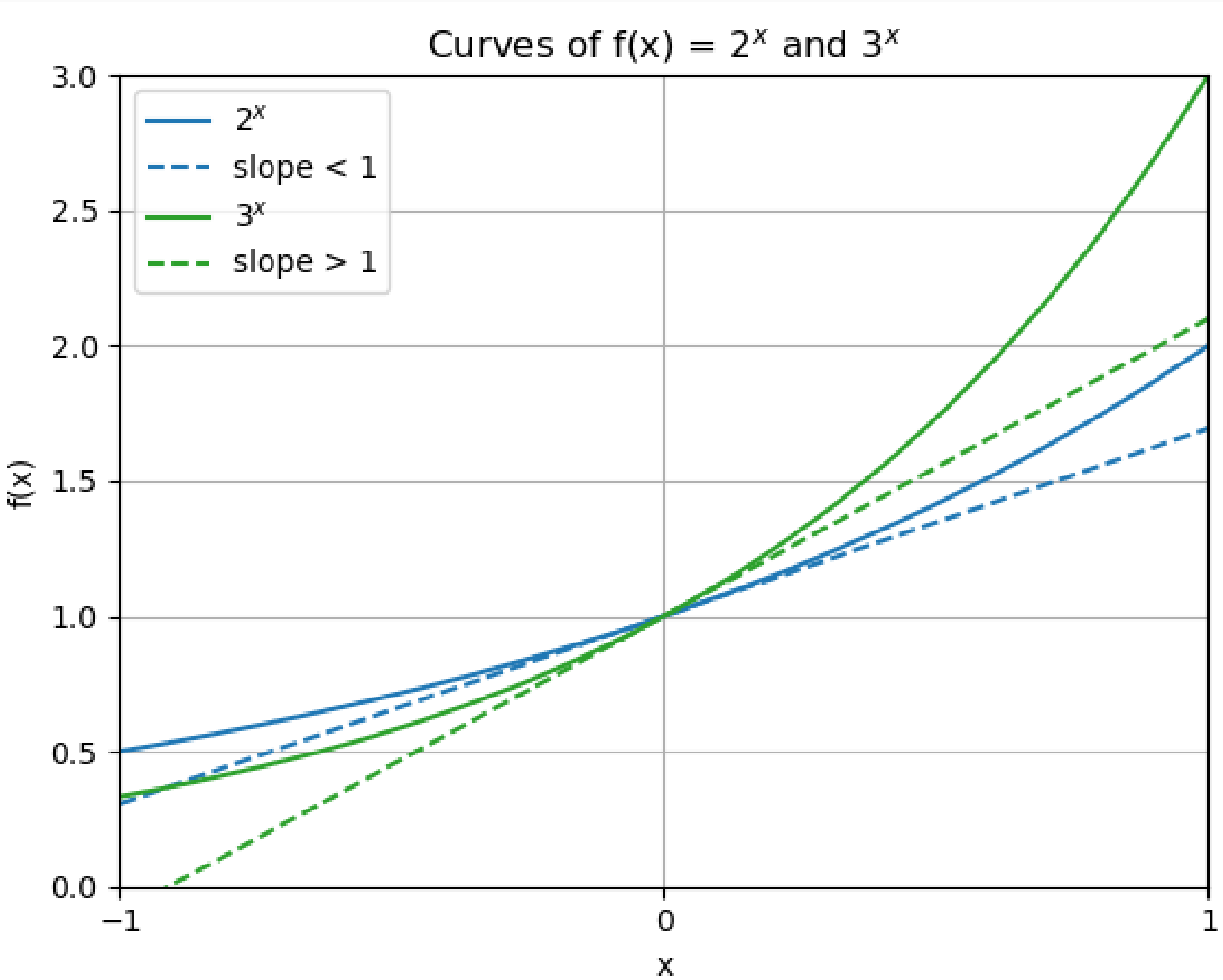
- This function is crucial in various fields, including calculus, complex analysis, and differential equations.
- The exponential function is particularly significant because it models growth and decay processes, such as population growth, radioactive decay, and interest calculations in finance.
- Its inverse, the natural logarithm function ($\ln(x)$), is equally important for solving equations involving exponentials.

Applications too vast to number

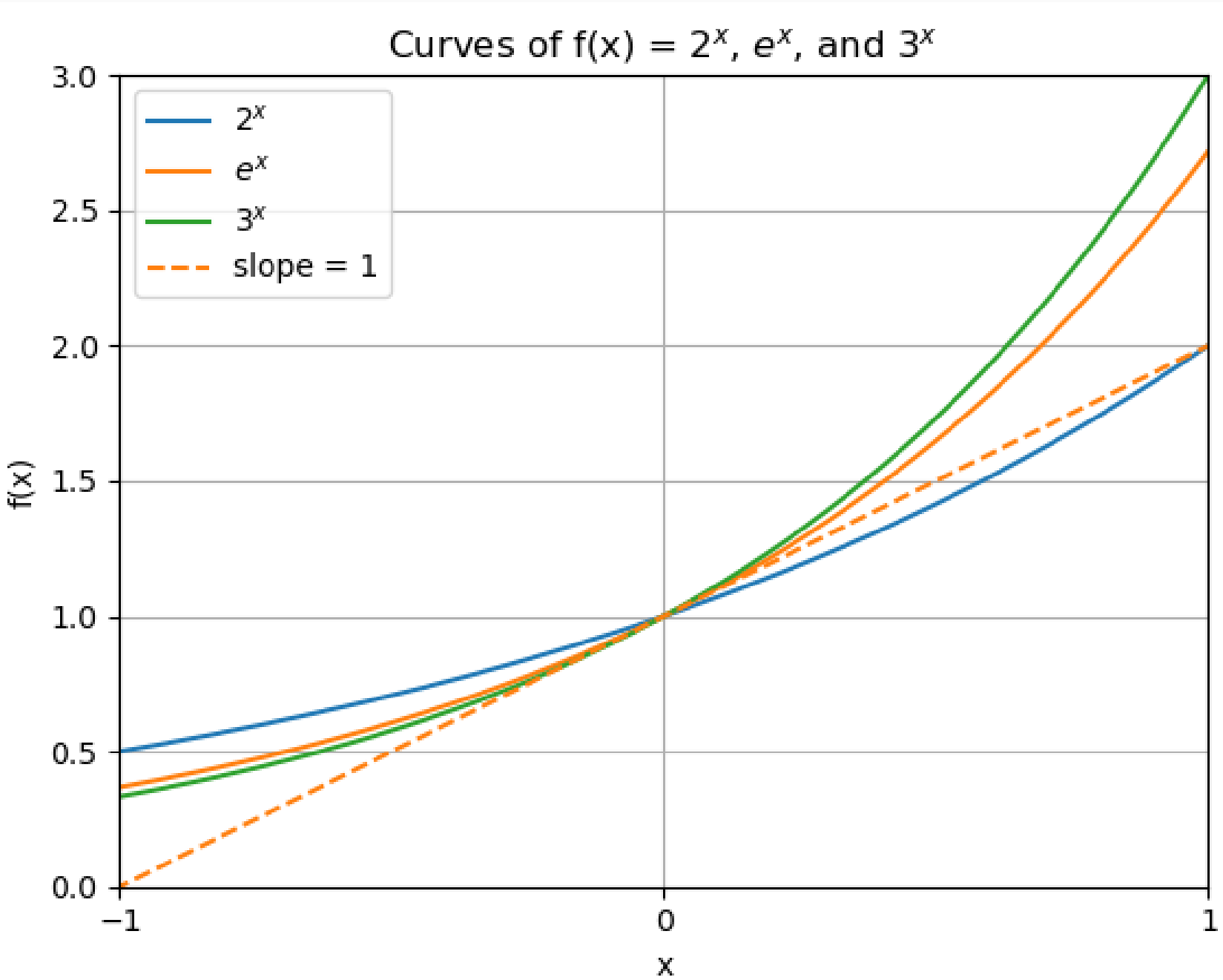
The exponential function has numerous important applications across various fields:

- Biology: Population Growth, Spread of Diseases, Carbon Dating
- Physics: Radioactive Decay, Newton's Law of Cooling
- Finance: Compound Interest
- Engineering: Current in Electrical Circuits, Integral Transforms
- Computer Science : Algorithm Analysis, Data Structures
- Chemistry: Reaction Rates
- Probability: Time Between Events, Reliability, Queueing Theory, Normal Distribution and CLT
- ...and more!

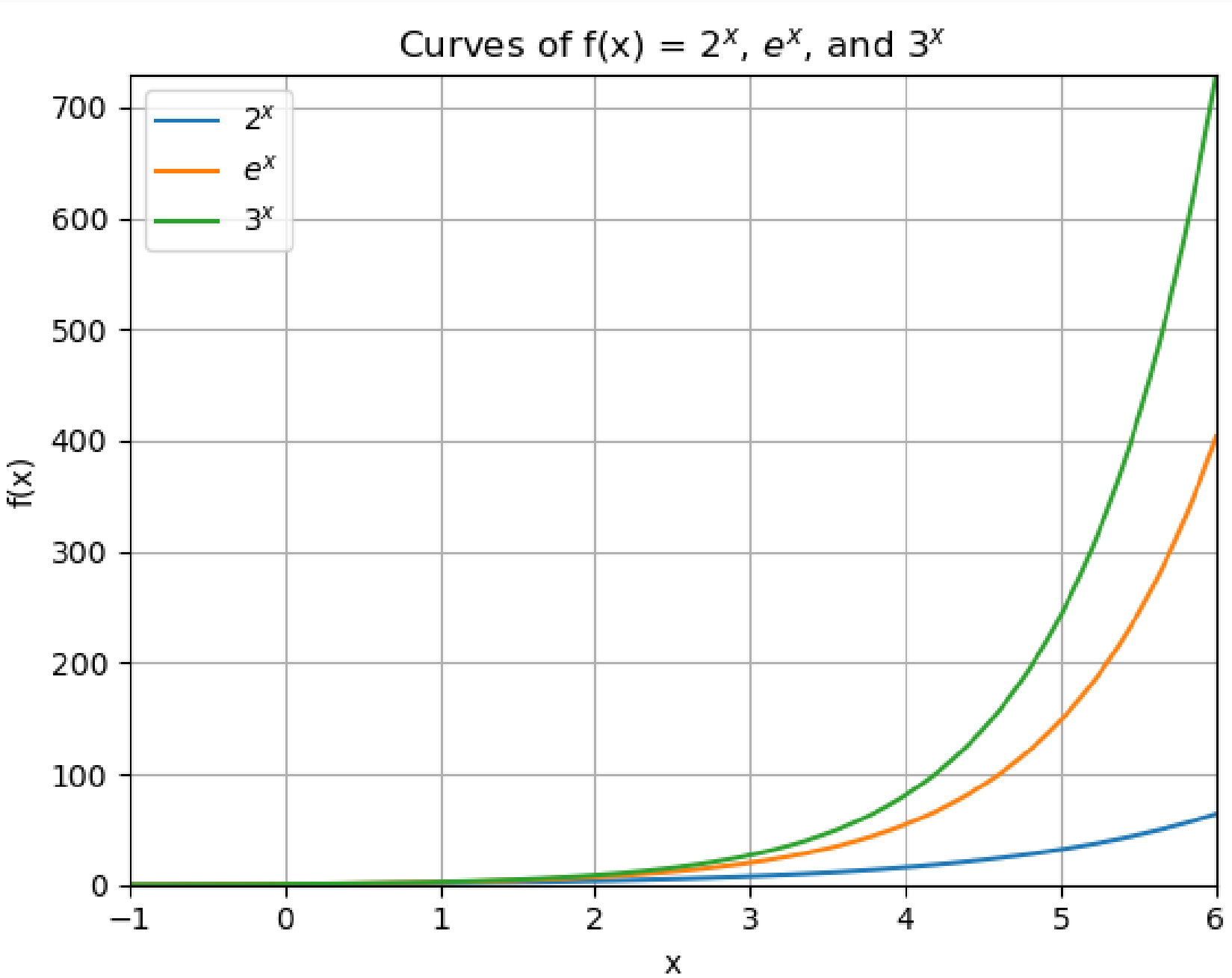
Bases you know



The natural base



Exponential growth is...EXPONENTIAL



More about e^x...

- Review Appendix 6.
- Read 6.4 for exponential function details.

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SHIFT TO WHITEBOARD

- Problem 1: Modeling growth
- Problem 2: Modeling cooling