

Agenda/Objectives/Notes PAPPC Chapter 2 Test Review, Section 3.1

Starter Problem

Solve $\frac{x^1 + 2x}{x^2 - 9} \leq 0$

Today's Agenda

1. Starter problem
2. Review assignment due
3. Today's objectives
4. Today's assignment (due 10/20): 226/1-59 EOO, 62, 68, 70, 74, 75, 80
5. Chapter 2 test review

Today's Objectives: You will be able to

1. Recognize and evaluate exponential functions with base a .
2. Graph exponential functions.
3. Recognize, evaluate, and graph exponential functions with base e .
4. Use exponential functions to model and solve real-life problems.

Notes/Examples

Definition of an Exponential Function

The **exponential function f with base a** is denoted by $f(x) = a^x$ where $a > 0$, $a \neq 1$, and x is any real number.

Transformations of Exponential Functions

Given the parent for an exponential function is $f(x) = a^x$, the translated for an exponential function is

$$g(x) = ca^{bx-h} + k \quad \text{where}$$

- c – vertical stretch or compression, reflection with respect to the x -axis
- a – exponential growth ($a > 1$) or decay ($0 < a < 1$)
- b – horizontal stretch or compression, reflection with respect to the y -axis
- h – horizontal shift
- k – vertical shift

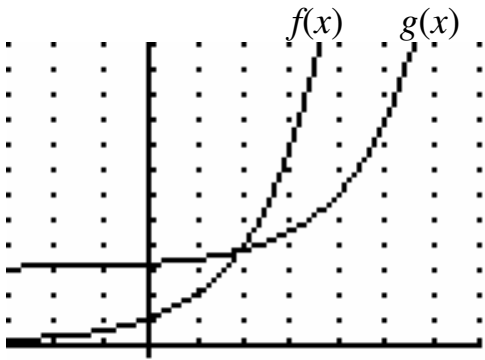
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Example:

State the transformations for the function

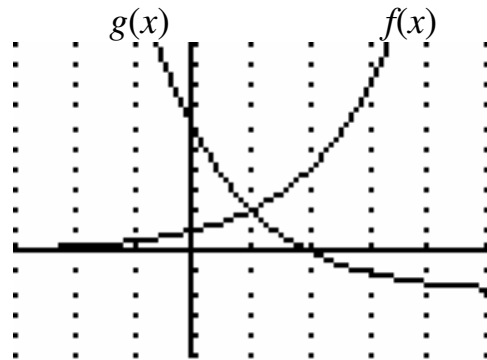
$$g(x) = 3 \cdot 2^{x-4} + 3.$$

The graph has a vertical stretch by a factor of 3, is an exponential growth function, shifts 4 units right and 3 units up.



$$g(x) = 2^{-(x-3)} - 2$$

This graph is reflected across the y-axis, shifts 3 units right, and 2 units down



Formulas for Compound Interest

After t years, the balance A in an account with principal P and annual interest r (in decimal form) is given by the following formulas.

1. For n compounding periods per year: $A = P \left(1 + \frac{r}{n} \right)^{nt}$

Ex: Find the amount of interest earned if \$10,000 is deposited at an annual interest rate of 4.2% compounded monthly for ten years.

$$A = 10000 \left(1 + \frac{.042}{12} \right)^{(12 \cdot 10)} = 15208.46 \text{ (this is the total amount)}$$

$15208.46 - 10000 = 5208.46$ is the interest amount

2. For continuous compounding: $A = Pe^{rt}$

Ex: Find the amount earned after 50 years if a deposit of \$5000 is made that will earn a 7.5% interest rate compounded continuously.

$$A = 5000e^{(.075 \cdot 50)} = \$212,605.41$$

Chapter 2 Test Review

1. Divide using synthetic division. (209/53-56)
2. +, -, x, / complex numbers and write in standard form. (209/63-78)
3. Determine the possible real rational zeros of a polynomial equation using the Rational Zero Test (210/89, 90)
4. Find all zeros of a polynomial using the Rational Zero Test and Synthetic Division. (210/91-96)
5. Write a polynomial equation given zeros. (210/97, 98)
6. Find zeros of a polynomial function given one or more zeros. (210/99-102)
7. Solve using the Quadratic Formula
8. Use Descartes' Rule of Signs to determine the possible number of positive and negative zeros of a function. (210/107, 108)
9. Determine the maximum number of zeros of a polynomial function using the Fundamental Theorem of Algebra. (169 example 1)
10. Determine the domain of a rational function. (210/119-134)
11. Determine the equations of horizontal, vertical, or any slant asymptotes of a rational function. (210/119-134)