Basic Transformations of Functions

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1 Administrivia

Announcements

Collect homework.

Assignment

Read 2.9. Online quiz.


From Last Time

Practice with word problems.

2 Introduction

Idea: Once we’ve mastered the toolkit functions and their graphs, there are many related functions we can sketch immediately once we understand some basic transformations of functions.

Transformation = modification.
2.1 Examples

1. Horizontal and vertical translations. Consider $y = x^2$, $y = x^2 + 1$, and $y = (x + 1)^2$.
   
   How does the second differ from the first? Why? (Think in terms of ordered pairs.)
   
   How does the third differ from the first? Why?
   
   Repeat for $f(x) = 2^x$.
   
   Which affects domain, which affects range?

2. Vertical stretching and horizontal compression. Consider $y = x^2$, $y = (2x)^2$, and $y = 2x^2$.
   
   How does the second differ from the first? Why? (Think in terms of ordered pairs.)
   
   How does the third differ from the first? Why?
   
   Repeat for $f(x) = \sin(x)$.
   
   Which is it, vertical stretching or horizontal compression?
   
   Which affects domain, which affects range?

3. Summarize. How do I:
   
   (a) shift graph to left?
   
   (b) shift graph up?
   
   (c) compress graph vertically?
   
   (d) shift graph down?
   
   (e) stretch graph horizontally?

3 Class Practice

Shouldn’t need calculators!!! Pp. 101–102: 1 a–f; 6 a–d.