MTH 30 LECTURE NOTES (Ojakian)

Topic 5: Transformation of Functions

OUTLINE
(References: 1.5)

1. Basic Function Shapes
2. Transforming Functions

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1. Basic Function Shapes

   See Table 13 on pages 26, 27, 28 (in Section 1.1)

   Also put exponential function.

2. Graph Transformations

   Type 1 Problem: From equation graph it.

   Type 2 Problem: From the graph, find the equation.

   Issue: One transformation, or more than one transformation ...

   (a) Vertical Shift (add/subtract outside function)
   (b) Horizontal Shift (add/subtract inside function)
   (c) Vertical Stretch/Compression (multiplication outside function)
      i. Larger than 1: Stretch
      ii. Between 0 and 1: Compression
   (d) Horizontal Stretch/Compression (multiplication inside function)
      i. Larger than 1: Compression
      ii. Between 0 and 1: Stretch
   (e) Reflection: Across y axis (negation inside function)
   (f) Reflection: Across x axis (negation outside function)

3. Combining Transformations
4. Even and Odd functions

   (a) Even: $f(x) = f(-x)$ (unchanged by reflection across x axis)
   (b) Odd: $f(x) = -f(-x)$ (unchanged by reflection across origin)