Pure Mathematics

BurntNail

Contents

Part I

Year 1 AS

Chapter 1

Graphs and Transformations

1.1 Transformations

1.1.1 Basic Transformations

Definition 1.1.1: Translation

- The graph of $f(x-a)$ is the graph of $f(x)$ translated right by a units.
- The graph of $f(x-a)$ is the graph of $f(x)$ translated right by a units.

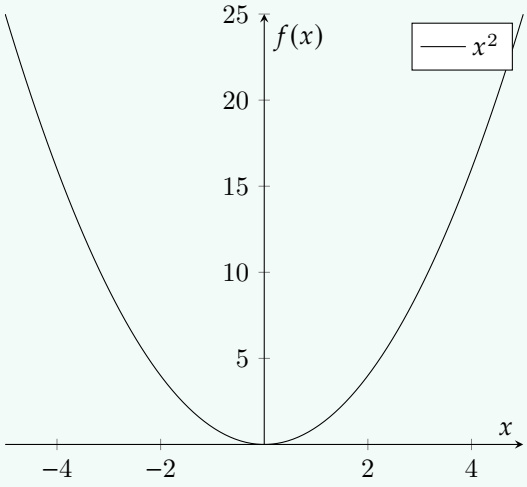
Definition 1.1.2: Scaling

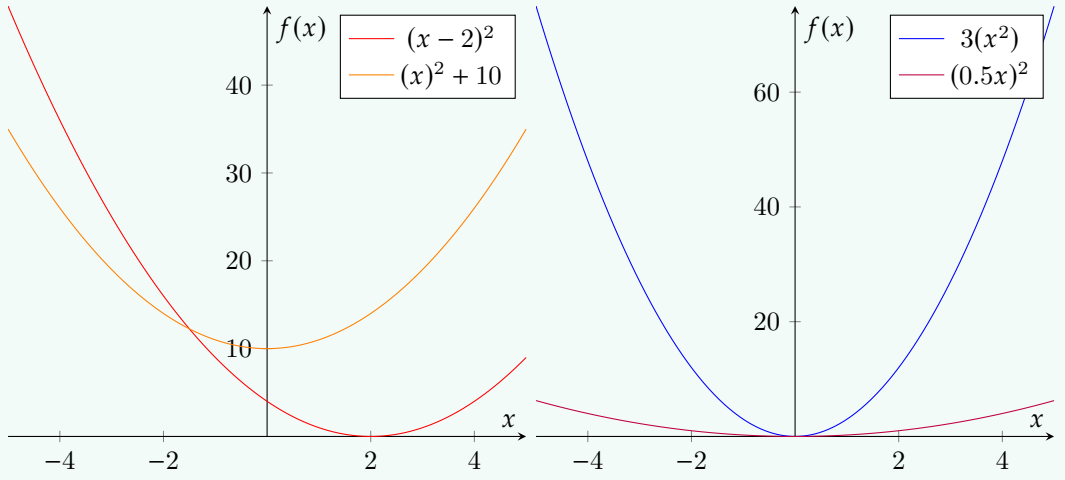
Note

Never say shrink - always say stretch by a factor e where $|e| < 1$

- The graph of $cf(x)$ is the graph of $f(x)$ stretched vertically by a factor of c.
- The graph of $f(dx)$ is the graph of $f(x)$ stretched horizontally by a factor of d^{-1}.

Example 1.1.1 (Basic Graph Transformations)





1.1.2 Combining Transformations

Example 1.1.2 (Combining Transformations)

$$y = f(-2x)$$

This is obtained from $f(x)$ by doing the following:

1. Flip horizontally.
2. Stretch horizontally by a factor of 0.5.

Example 1.1.3 (Combining Transformations)

$$y = cf(\frac{1}{a} * (x-b)) + d$$

This is obtained from $f(x)$ by doing the following:

1. Shift to the right b units.
2. Stretch horizontally by a factor of a.
3. Stretch vertically by a factor of c.
4. Shift upwards by d units.