Chapter 1

Section 1.3 New Functions from Old Functions

Transformations of functions

**Translations**

, shifts the graph of a distance of c units upward

, shifts the graph of a distance of c units downward

, shifts the graph of a distance of c units to the right

, shifts the graph of a distance of c units to the left

**Stretching and Reflecting**

, stretch the graph of vertically by a factor of c

, compresses the graph of vertically by a factor of c

, compresses the graph of horizontally by a factor of c

, stretch the graph of horizontally by a factor of c

, reflects the graph of about the x-axis

, reflects the graph of about the y-axis

1. Vertical shift factor (shifts down when negative)
2. Vertical stretch factor (reflects on x-axis if negative)
3. Horizontal stretch factor (reflects on y-axis if negative)
4. Horizontal shift factor (shifts to the right when negative)

**Amplitude** – the factor by which to stretch the sine curve vertically. where h is the highest point and l is the lowest point on the curve.

**Absolute Value** – the part of the curve that lies above the x axis stays the same while the part below is reflected in the x-axis

Combinations of Functions

is the domain of and is the domain of

|  |  |
| --- | --- |
| **Addition**  Domain: |  |
| **Subtraction**  Domain: |  |
| **Multiplication**  Domain: |  |
| **Division**  Domain: |  |
| **Composition**  The domain of is the set of all x in the domain of g such that is the domain of |  |

**Exponential functions** (Has a y intercept of 1)

where

Certain values of come up a lot

The slope of the graph of .

Def:

Properties of exponents

Ex:

Hyperbolic Trigonometric functions

**Logarithmic functions**

or

Properties of Logarithmic Functions

Common

“lon x” (natural logarithm)

: the slope of it at

**Inverse Functions**

is the inverse of

* If f
* Usually we denote the inverse of f(x) by
* -->

1. The inverse of f
2. The inverse of
3. has inverse
4. has inverse
5. has inverse

* In general

1. The inverse of or