**Section 1.1 Functions and Change**

**A Function:** a rule that assigns exactly one output to every input,

**Domain:** set of all valid input values (i.e. valid x-values)

**Domain restrictions:**
- Division by zero
- Radicals
- Logarithms

**Range:** set of all valid output values (i.e. possible y-values)

**Linear Functions:** \( y = f(x) = mx + b \), where \( m \) is the slope and \( b \) is the y-intercept. Linear functions are just lines and are some of the simplest functions we will encounter.

Another commonly used equation for a line is:
\[
y - y_0 = m(x - x_0)
\]

where \( m \) is the slope and \((x_0, y_0)\) is some point on the line.

The right hand side is called a difference quotient (the quotient of the difference of two values).

**Delta Notation** ‘\( \Delta x \)’ for instance means ‘change in x’

**Increasing Function:** the values of \( f(x) \) increase as the values of \( x \) increase.

**Decreasing Function:** the values of \( f(x) \) decrease as the values of \( x \) increase.

**Proportionality:** \( y \) is directly proportional to \( x \) if \( y = kx \)
\( y \) is inversely proportional to \( x \) if \( y = \frac{k}{x} \)

**Section 1.1 Homework Problems**

1, 4-7, 9, 12, 16, 17, 20, 21, 27, 40, 44