Linear Functions

A linear function has the form of \( f(x) = ax + b \) and its graph is a straight line. Since a linear function is a continuous straight line its domain and range would consist of all real numbers. Graphing a linear function can be accomplished by first finding the x- and y-intercepts. This will provide two points that can be used to draw the line.

Finding the intercepts:
1. To find the y-intercept let \( x \) equal zero and solve for \( y \)
2. To find the x-intercept let \( y \) equal zero and solve for \( x \)

Example 1: Graph \( y = -2x + 6 \).

Solution

Step 1: Find the y-intercept

Let \( x = 0 \) and solve for \( y \)

\[
\begin{align*}
y &= -2x + 6 \\
y &= -2(0) + 6 \\
y &= 0 + 6 \\
y &= 6 \\
\end{align*}
\]

The y-intercept is at \((0, 6)\).

Step 2: Find the x-intercept

Let \( y = 0 \) and solve for \( x \)

\[
\begin{align*}
y &= -2x + 6 \\
0 &= -2x + 6 \\
-6 &= -2x \\
3 &= x \\
\end{align*}
\]

The x-intercept is at \((3, 0)\).
Example 1 (Continued):

Step 3: Plot the intercepts and draw the line