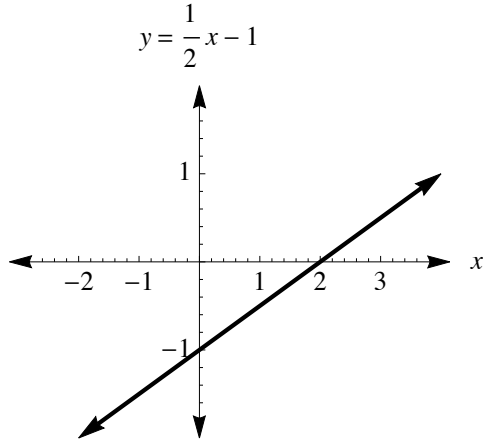
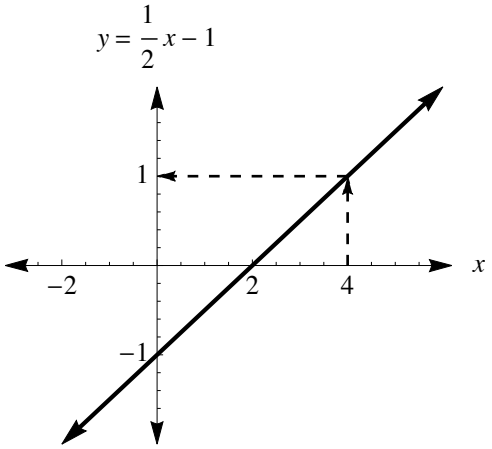
Domain of a Function (review)

The **Domain** of a function is the allow set of input values (all the allowable x values that yield y values). One function that we have looked at a lot is the function of a line: $f(x) = m\,x + b$. Below is the plot of a line $y = \frac{1}{2}x - 1$:

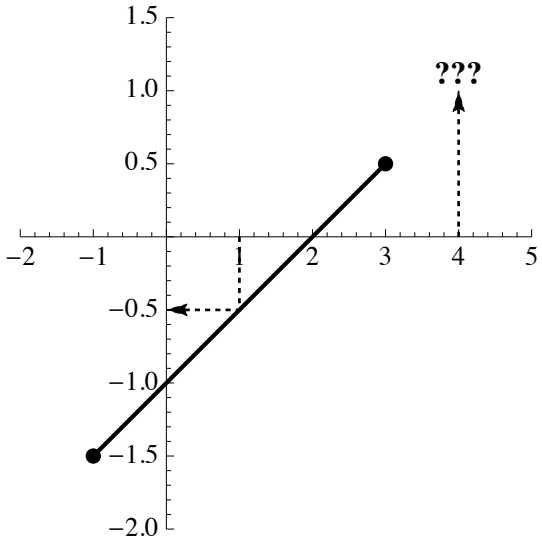


A line is often drawn with arrowheads on each end to indicate that it extends indefinitely in both directions. No matter what value of x we choose, there is a corresponding value of y (as shown for $x = 4$, which maps to $y = 1$) in the figure below.



For a (non-vertical) straight line, its domain is the set of real numbers: we can choose any real number for x and we can get a corresponding y value. We denote this domain as $(-\infty,\ \infty)$.

For a line segment, such as the one shown below, we can only choose x values between -1 and 3 to get a corresponding y value. The domain of that line segment is therefore $[-1,\ 3]$, which means that x is limited to $-1 \le x \le 3$.



If we choose an x value between -1 and 3, we can obtain a corresponding y value. But if we choose an x value that is less than -1 or greater than 3, there is no corresponding y value (as shown above for $x = 4$).

For a line segment with endpoints $(x_0,\ y_0)$ and $(x_1,\ y_1)$, its domain is $[x_0,\ x_1]$.