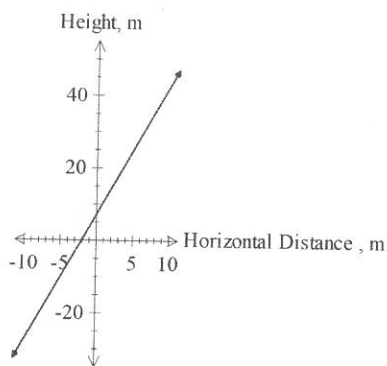


In some word problems it does not make sense to use negative numbers, or for our lines to continue forever, as shown in the following examples.

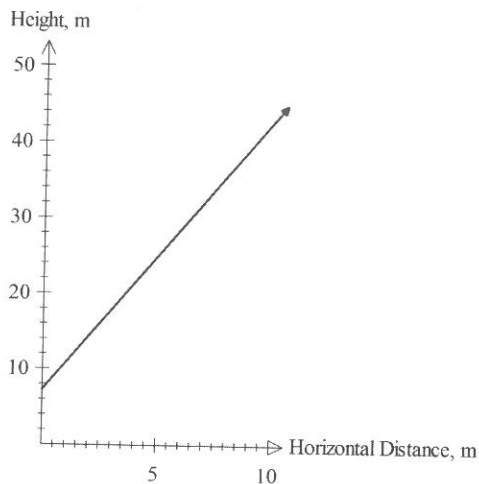
#### Example 4: Using Appropriate Graphs for Applications of Linear Functions.

A rocket follows a path given by  $y = 3.54x + 7.25$ , where  $x$  represents the distance from the launch pad and  $y$  represents the height. Two graphs are drawn.

Both graphs show the equation accurately but the second graph fits the situation better. Explain why.



Graph 1



Graph 2

Note that the domains and ranges of these two graphs are different although they use the same linear function to model both situations.

Graph 1: Domain:  $x \in \mathbb{R}$

Range:  $y \in \mathbb{R}$

Graph 2: Domain:  $x \geq 0$

Range:  $y \geq 7.25$

*Only valid for x-values equal and greater than 0.*  
*Only valid for y-values equal and greater than 7.25.*

The domain and range of Graph 2 is restricted because the rocket is only moving forward from its starting point and it is launched from a height of 7.25 m and the height only increases from that value.

*↑ y-intercept.*