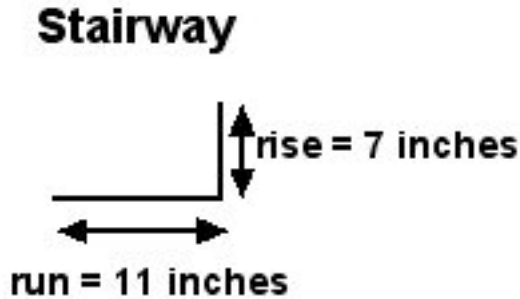
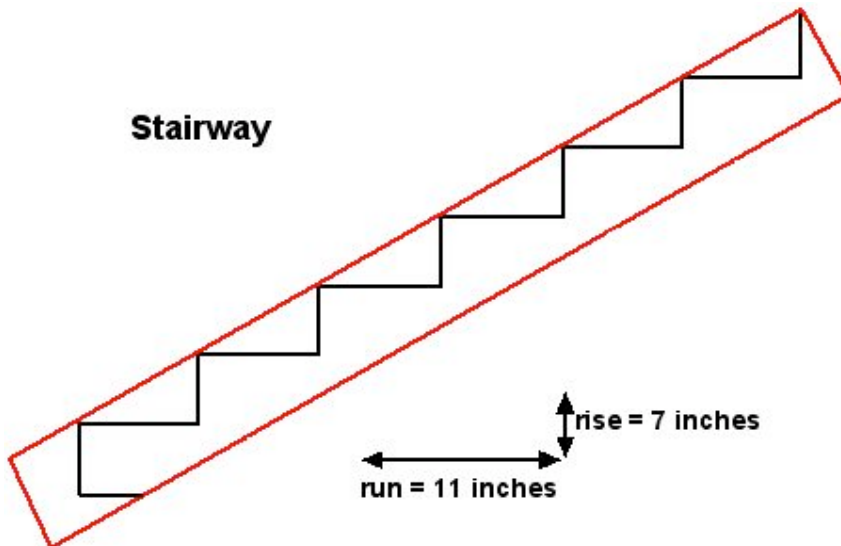


## Using Rise over Run to Cut Boards for a Staircase

The diagram below illustrates how “rise” and “run” are arranged on a typical staircase.



Now, the diagram below will show you how a two by twelve board is cut to make this stairway.



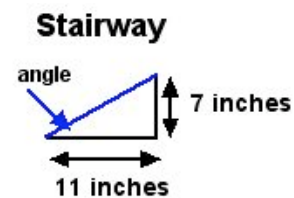
What you need to know is the angle that the board has to be cut at. This angle will be between the board and the horizontal line, as shown on the right. Here is the working to compute the angle:

$$\tan \text{ angle} = \frac{\textit{opposite}}{\textit{adjacent}}$$

$$\tan \text{ angle} = \frac{7}{11} = 0.636363\dots$$

$$\textit{angle} = \tan^{-1}(0.636363)$$

$$\textit{angle} = 32.5^\circ$$



So, you will cut your board at about  $32^\circ$ , since that is about your accuracy of your saw. The angle from the board to the vertical line is  $90^\circ - 32^\circ = 58^\circ$ . For those who do not know what the  $\tan^{-1}$  means, you can get it by pressing “2<sup>nd</sup> tan” on your calculator. Other calculators may have “2<sup>nd</sup> F” tan, or “INV tan”. Of course, if your stairs are steeper, or shallower, than  $32.5^\circ$ , then substitute in different numbers for “rise” and “run”.