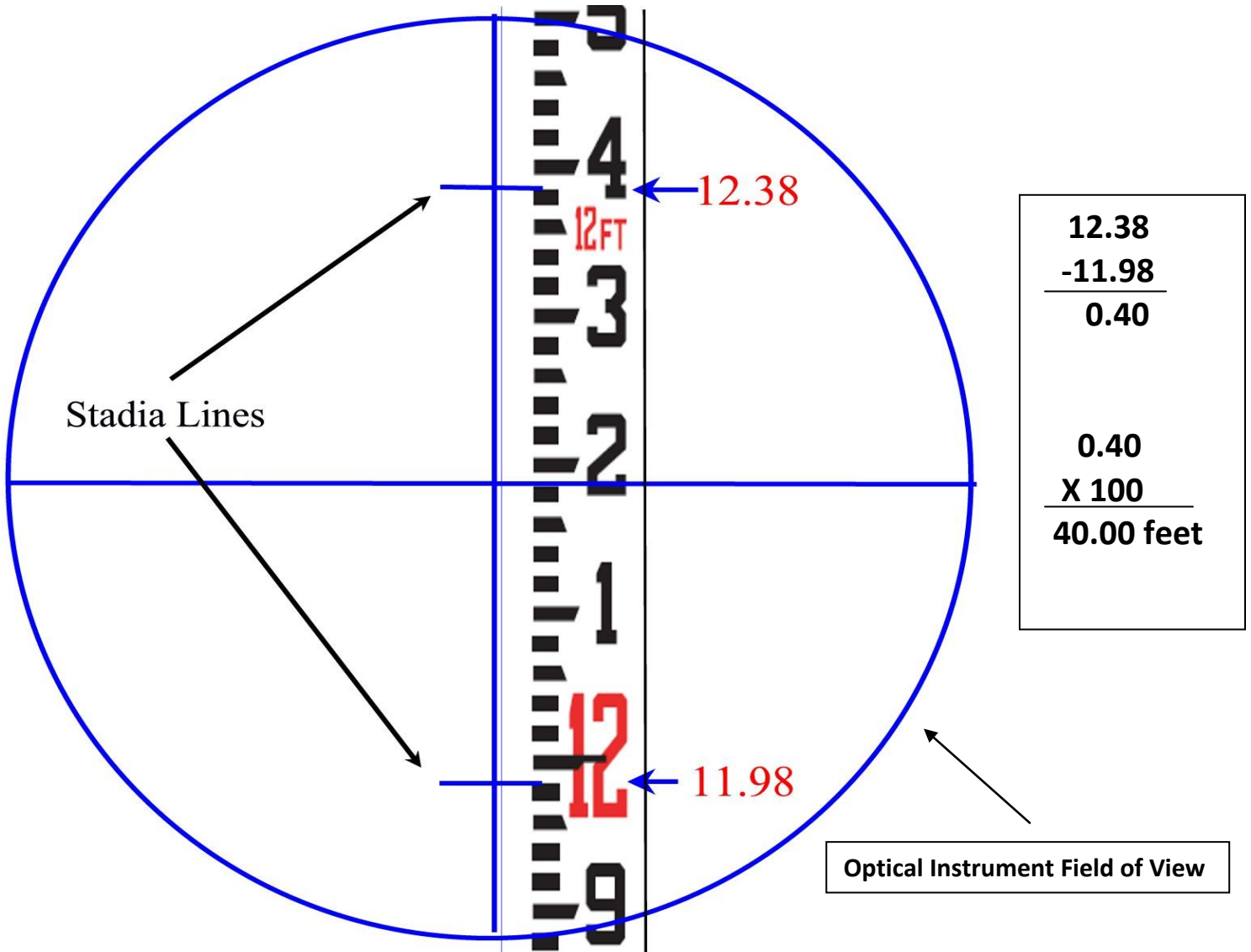


STADIA: Optical Distance Measuring

Optical instruments require a vertical and horizontal crosshair to be functional. Some optical instruments also have two short horizontal lines, one above and one below the horizontal crosshair. These lines are termed Stadia Lines or Stadia Hairs. When used with an **Engineering Grade Rod**, the distance from the instrument to the rod can be determined quickly by subtracting the bottom stadia reading from the top reading and multiplying the difference by 100.



In this example, subtracting the top reading of 12.38 by the lower reading of 11.98 gives a difference of .40. Multiplying the difference of 0.40 times 100 gives the distance of 40.00 feet.

Determining Stadia distances is useful if accuracy is not essential. The user must make a judgment of the reading on the grade rod. The quality of the optics and the distance (as well as the user's eyesight) can introduce errors. If an error of reading is .01' in the difference between the top and bottom stadia hair when the rod is 100' away from the instrument, an error of 1' is the result.

Because of the accuracy of Total Stations and handheld distance meters, the use of Stadia for distance measurement may soon become akin to using a slide ruler for making calculations. However, instruments currently sold from simple levels to total stations are still produced with Stadia. Current manufacturing standards allow all Stadia to have a Stadia Constant of 100. Early instruments had individually prepared reticles with crosshairs made from spider web. Each instrument had to be field tested and affixed its own Stadia Constant. Even though the current manufacturing default is 100, many instrument technical specification sheets still show Stadia Ratio: 1:100.