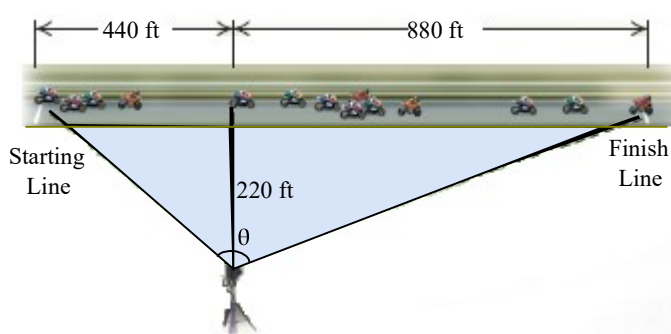


Student: Cole Lamers
Date: 07/11/19

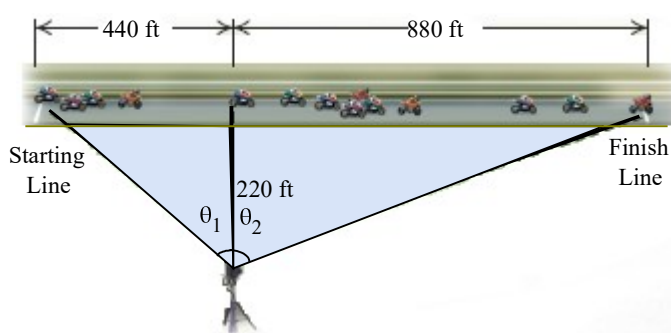
Instructor: Kelly Galarneau
Course: CA&T Internet (70263)
 Galarneau

Assignment: 5.6 Inverse Trigonometric Functions

A video camera is set up 220 feet away from and at a right angle to a straight quarter-mile racetrack, as shown in the figure. The starting line is to the left, and the finish is to the right. Through what angle must the camera rotate to film the entire race?



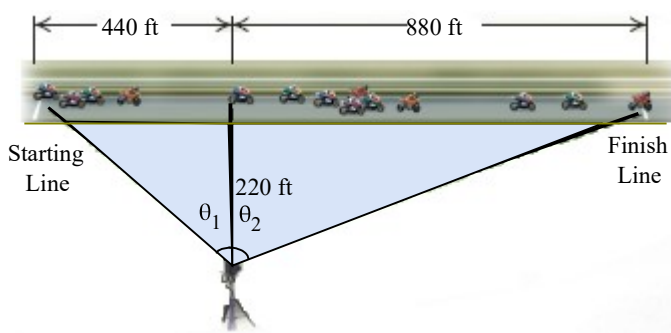
Let θ be the angle through which the camera must rotate to film the entire race. Let θ_1 and θ_2 be the angles as shown in the figure to the right such that $\theta = \theta_1 + \theta_2$.



The trigonometric functions that relates θ_1 with the known sides is **tan**.

Apply the definition of **tan** θ .

$$\tan \theta_1 = \frac{440}{220}$$



Simplify.

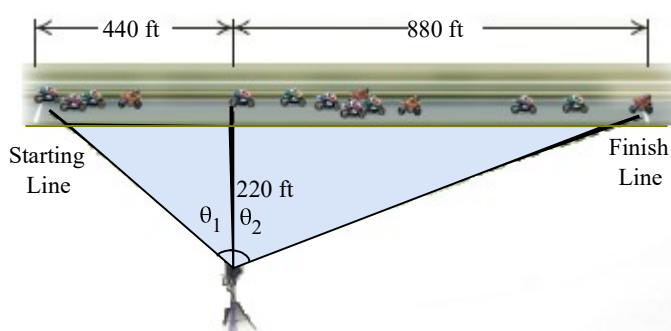
$$\begin{aligned}\tan \theta_1 &= \frac{440}{220} \\ &= 2\end{aligned}$$

To find the value of θ_1 , apply \tan^{-1} on both sides. Round to the nearest tenth.

$$\begin{aligned}\tan^{-1}(\tan \theta_1) &= \tan^{-1}(2) \\ \theta_1 &= 63.4\end{aligned}$$

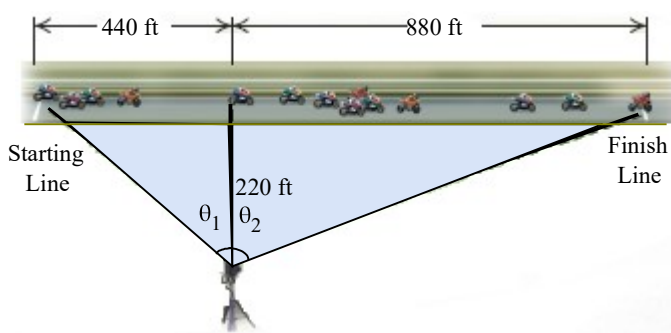
Use a calculator in degree mode.

The trigonometric functions that relates θ_2 with the known sides is **tan**.



Apply the definition of **tan** θ .

$$\tan \theta_2 = \frac{880}{220}$$



Simplify.

$$\begin{aligned}\tan \theta_2 &= \frac{880}{220} \\ &= 4\end{aligned}$$

To find the value of θ_2 , apply \tan^{-1} on both sides.

$$\tan^{-1}(\tan \theta_2) = \tan^{-1}(4)$$

$\theta_2 = 76$ Use a calculator in degree mode.

Now substitute the values of θ_1 and θ_2 in the equation $\theta = \theta_1 + \theta_2$ and solve for θ .

$$\begin{aligned}\theta &= \theta_1 + \theta_2 \\ &= 63.4 + 76 \\ &= 139\end{aligned}$$

Therefore, the camera must rotate through an angle of 139° to film the entire race.