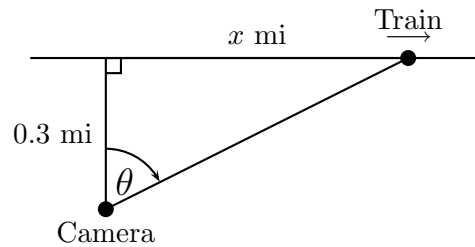


8. [12 points]

A train is traveling eastward at a speed of 0.4 miles per minute along a long straight track, and a video camera is stationed 0.3 miles from the track, as shown in the figure. The camera stays in place, but it rotates to focus on the train as it moves.

Suppose that t is the number of minutes that have passed since the train was directly north of the camera; after t minutes, the train has moved x miles to the east, and the camera has rotated θ radians from its original position.



a. [3 points] Write an equation that expresses the relationship between x and θ .

b. [4 points] Suppose that seven minutes have passed since the train was directly north of the camera. How far has the train moved in this time, and how much has the camera rotated?

c. [5 points] How fast is the camera rotating (in radians per minute) when $t = 7$?