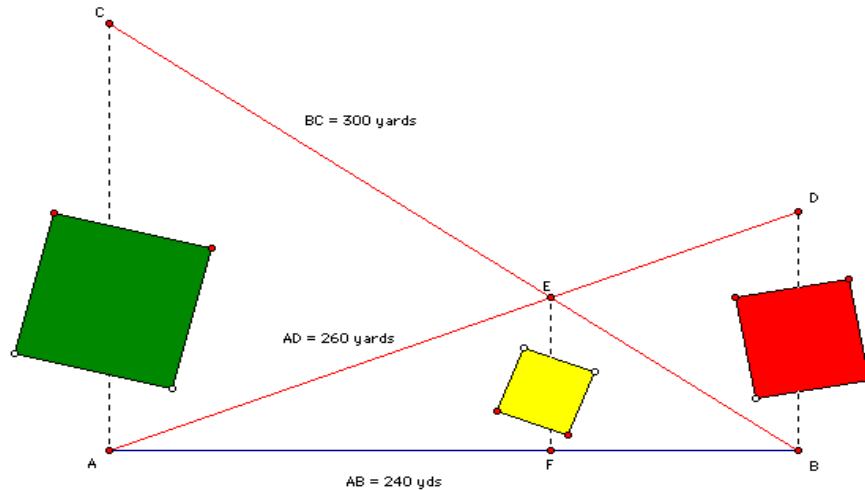# Distance Survey Problem

Problem:

A light pole is to be installed at point E, the intersection of CB and AD. How far will the pole be from the road? That is, what is the distance EF? Again, an existing building blocks direct measurement.

Solution: First, let's find the lengths of AC and BD

Length of AC $= AC^2 + 240^2 = 300^2 \Rightarrow AC^2 + 57600 = 90000 \Rightarrow AC^2 = 32400$
So, $AC = 180$.

Length of BD$= BD^2 + 240^2 = 260^2 \Rightarrow BD^2 + 57600 = 67600 \Rightarrow BD^2 = 10000$
So, $BD = 100$.

Now, ΔABC and ΔEFB are similar triangles

So, $\frac{EF}{180} = \frac{FB}{240} \Rightarrow EF = \frac{3}{4}FB$

And, ΔABD and ΔAEF are similar triangles

So, $\frac{EF}{100} = \frac{FA}{240} \Rightarrow EF = \frac{5}{12}FA$

Hence, $\frac{3}{4}FB = \frac{5}{12}FA \Rightarrow FB = \frac{5}{9}FA$

Since, $FA + FB = 240$

$$FA + \frac{5}{9}FA = 240$$

$$\frac{14}{9}FA = 240$$

$$FA = \frac{1080}{7}$$

So, $EF = \frac{5}{12}FA = \frac{5}{12} \cdot \frac{1080}{7} = 64.29$

Hence, the light post will be slightly more than 64 yards from the road.