**PROBLEM:**

In the figure below, given that $AB = 240$ yards, $AD = 260$ yards, and $BC = 300$ yards, what is $EF$?

By the Pythagorean Theorem, we have

$$AB^2 + AC^2 = BC^2 \rightarrow 240^2 + AC^2 = 300^2 \rightarrow (60 \cdot 4)^2 + AC^2 = (60 \cdot 5)^2$$

$\rightarrow AC = 60 \cdot 3 = 180$ yards

And

$$AB^2 + BD^2 = AD^2 \rightarrow 240^2 + BD^2 = 260^2 \rightarrow (20 \cdot 12)^2 + BD^2 = (20 \cdot 13)^2$$

$\rightarrow BD = 20 \cdot 5 = 100$ yards

Now, using similar triangles, we have the following:

$$\frac{EF}{AF} = \frac{BD}{AB} \rightarrow \frac{EF}{AF} = \frac{100}{240} \rightarrow EF = \left(\frac{5}{12}\right)AF$$

And

$$\frac{EF}{BF} = \frac{AC}{AB} \rightarrow \frac{EF}{BF} = \frac{180}{240} \rightarrow EF = \left(\frac{3}{4}\right)BF$$

So

$$\left(\frac{5}{12}\right)AF = \left(\frac{3}{4}\right)BF = \left(\frac{3}{4}\right)(AB - AF) = \left(\frac{3}{4}\right)(240 - AF) = 180 - \left(\frac{3}{4}\right)AF$$

$$\rightarrow \left(\frac{5}{12} + \frac{3}{4}\right)AF = 180 \rightarrow \left(\frac{14}{12}\right)AF = 180 \rightarrow AF = \frac{1080}{7}$$

Thus, $EF = \left(\frac{5}{12}\right)AF = \left(\frac{5}{12}\right)\left(\frac{1080}{7}\right) = \frac{450}{7} = 64 \frac{2}{7}$ yards.