Class Practice on Work Problem #1

Crew A can frame a house in 20 hours and crew B can frame the same house in 15 hours. Working together, how long will it take both crews to frame the house?
Let $T =$ the time it will take both crews, working together, to do the whole job.

Crew A can do the whole job in 20 hours. In one hour they do $\frac{1}{20}$ th of the job.

So, in $T$ hours they do $\frac{1}{20} \cdot T$ of the job.

Crew B can do the whole job in 15 hours. In one hour they do $\frac{1}{15}$ th of the job.

So, in $T$ hours they do $\frac{1}{15} \cdot T$ of the job. As a result we can say that:

$$\frac{1}{20} \cdot T + \frac{1}{15} \cdot T = 1$$

$$\frac{T}{20} + \frac{T}{15} = 1$$

$$\frac{T \cdot 3}{20 \cdot 3} + \frac{T \cdot 4}{15 \cdot 4} = 1$$

$$\frac{3T}{60} + \frac{4T}{60} = 1$$

$$\frac{7T}{60} = 1$$

$$7T = 60$$

$$T = 8\frac{4}{7} \text{ hours}$$