There are two painting crews A and B. Crew A can paint a house in 30 hours. If A and B work together they can paint the house in 10 hours. How long would it take crew B, working by itself, to paint the whole house?
Answer

Let $x = \text{the time for crew B to do the whole job.}$

Crew A can do the whole job in 30 hours. In one hour they do $\frac{1}{30}$ of the job.

So, in 10 hours they do $\frac{1}{30} \cdot 10$ of the job.

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

So, in 10 hours they do $\frac{1}{x} \cdot 10$ of the job. As a result we can say that:

$$\frac{1}{30} \cdot 10 + \frac{1}{x} \cdot 10 = 1$$

$$\frac{1}{3} + \frac{10}{x} = 1$$

$$\frac{1 \cdot x}{3 \cdot x} + \frac{10 \cdot 3}{x \cdot 3} = 1$$

$$\frac{x + 30}{3x} = 1$$

$$x + 30 = 3x$$

$$30 = 2x$$

$$x = 15 \text{ hours}$$