Work Problems

Name_____

1. In the movie **"**Little Big League", Billy Heywood seeks assistance from baseball players in solving a homework problem. The problem states, "Joe can paint a house in three hours, and Sam can paint the same house in five hours. How long does it take for them to do it together?"

Algebraic Solution:	
Express the painting rates (houses painted per hour):	$\left(c\,\frac{\text{houses}}{\text{hour}}\right) \bullet (d \text{ hours}) = cd$ houses painted
Joe can paint $\frac{1}{3}$ of the house in one hour.	$\left(\frac{1}{3}+\frac{1}{5}\,\frac{\text{houses}}{\text{hour}}\right) \bullet (x \text{ hours}) = 1$ house painted
Sam can paint $\frac{1}{5}$ of the house in one hour.	$\left(\frac{1}{3}+\frac{1}{5}\right)x = 1; \quad \frac{8}{15}x = 1; \quad x = \frac{15}{8} = 1\frac{7}{8}$ hours
Together they paint $\frac{1}{5}+\frac{1}{3}$ of the house in one hour.	

One of the baseball players explains that to solve the problem, all you need is the formula $\frac{a \times b}{a+b}$ where a and b represent the numbers of hours needed by each individual. $\frac{a \times b}{a+b} = \frac{3 \times 5}{3+5} = 1\frac{7}{8}$ *Yep, it works!!!*

Solve the equation $\left(\frac{1}{a}+\frac{1}{b}\right) \bullet x = 1$ for x, to show that $x = \frac{a \times b}{a+b}$.

2. a.) Two of the baseball players offer solutions of 15 hours and 8 hours. Explain why these answers are logically incorrect.

b.) One of the baseball players suggests that this is a trick question and that perhaps there is no answer. Explain why this cannot be a trick question.

3. a.) Larry can mow the baseball grounds in 5 hours; Curly can move the ground in 3 hours; and Moe can mow the ground in 4 hours. How long will it take Larry, Curly and Moe to mow the baseball grounds if they work together? *Use the algebraic approach.*

b.) Show that the amended version of the baseball player's formula, shown below, does not yield the same result as obtained in part **a**.

$$\frac{a \times b \times c}{a + b + c}$$

c.) What would the baseball player's formula need to be in order to work with three individuals?

4. Ralph can paint a house in 7 hours and Jeff can paint the same house in 8 hours. How long with it take Ralph and Jeff working together to put **two** coats of paint on the house.

5. Together, Karen and Josie can clean a house in 5 hours. If it takes Karen 8 hours working alone to clean the same house, how long does it take Josie working alone to clean this house?