WORKING TOGETHER IS A GOOD THING!

Your Name:_____
Partner #1: _____
Partner #2:_____
Partner #3:_____

Example 1: You can paint a room in 6 hours. Your friend can paint the same room in 8 hours. How long would it take to paint the room if you did the job **working together**?

Step 1) Let x = the number of hours to paint the room working together

Step 2) The part of job you can do in 1 hour in fractional form is $\frac{1}{6}$.

The part of job your friend can do in 1 hour in fractional form is $\frac{1}{8}$.

The part of job you and your friend can do together in 1 hour is $\frac{1}{x}$.

Step 3) Make a chart to organize the problem.

part you do in 1 hr +	part your friend does in 1 hr =	part working together in 1 hr
$\frac{1}{6}$ +	$\frac{1}{8}$ =	$\frac{1}{x}$

Step 4) Solve the rational equation by multiplying both sides of the equation by the Least Common Denominator of all the denominators in the equation.

$$\frac{1}{6} + \frac{1}{8} = \frac{1}{x}$$
$$24x \cdot \left(\frac{1}{6} + \frac{1}{8}\right) = 24x \cdot \frac{1}{x}$$
$$24x \cdot \frac{1}{6} + 24x \cdot \frac{1}{8} = 24x \cdot \frac{1}{x}$$
$$4x + 3x = 24$$
$$\frac{7x}{7} = \frac{24}{7}$$
$$x = 3\tfrac{3}{7}$$

Step 5) Write a sentence explaining your answer which includes the units.

It would take $3\frac{3}{7}$ *hours to paint the room if I did the job working with my friend!* ★

When we work together, jobs get done faster!

Solve the following problems in your group using the five-step method.

A) Barak can design a website in 10 hours. Michelle can design the same website in 8 hours. How long would it take them to design the website if they worked together?

Step 1)
Step 2)

Step 3)

Step 4)

Step 5)

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B) George can clean the oval office in 3 hours while Laura can clean the oval office in 2 hours. How long would it take them to clean the oval office working together?

Step 1)
Step 2)

Step 3)

Step 4)

Step 5)

C) A hurricane strikes and a rural area is without food or water. Three crews arrived. One can dispense needed supplies in 10 hours, a second in 15 hours, and a third in 20 hours. How long would it take all 3 crews to dispense the food and water working together?

Step 1)
Step 2)

Step 3)

Step 4)

Step 5)
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Example 2: Hillary can wash a car in 20 minutes. Bill and Hillary can wash the same car in 15 minutes. How long would it take Bill to wash the car by himself?

Step 1) Let x = the number of hours for Bill to wash the car by himself.
Step 2) The part of job Hillary can do in 1 minute in fractional form is $\frac{1}{20}$.

The part of job Bill can do in 1 minute in fractional form is $\frac{1}{x}$.

The part of job Bill and Hillary can do together in 1 hour is $\frac{1}{15}$.

Step 3) Make a chart to organize the problem.

part Hillary does in 1 min		part Bill does in 1 minute		part working together in 1 min
$\frac{1}{20}$	$+$	$\frac{1}{x}$	$=$	$\frac{1}{15}$

Step 4)

$$\frac{1}{20}+\frac{1}{x}=\frac{1}{15} \Rightarrow 60x\cdot\left(\frac{1}{20}+\frac{1}{x}\right)=60x\cdot\frac{1}{15} \Rightarrow 60x\cdot\frac{1}{20}+60x\cdot\frac{1}{x}=60x\cdot\frac{1}{15}$$

$$\Rightarrow 3x+60=4x \Rightarrow 60=4x-3x \Rightarrow 60=x \Rightarrow x=60$$

Step 5) *It would take Bill 60 minutes to wash the car.* ★

D) Maria can write a speech in 6 hours. Together, Maria and Arnold can write the same speech in 4 hours. How long would it take Arnold to write the speech by himself?

Step 1)
Step 2)

Step 3)

Step 4)

Step 5)

E) A Challenge Problem! Suppose the kitchen sink can be filled in 5 minutes. If the sink is full, it takes 8 minutes to drain the sink when the drain is partially open. If the sink's drain is accidentally left partially open, how long will it take to fill the sink?

Step 1)
Step 2)

Step 3)

Step 4)

Step 5)