Lesson 33 Problem Set 5•4

1. Ms. Hayes has $\frac{1}{2}$ liter of juice. She distributes it equally to 6 students in her tutoring group.
   a. How many liters of juice does each student get?

   \[
   \frac{1}{2} \div 6 = \frac{1}{2} \times \frac{1}{6} = \frac{1}{12} \text{ L}
   \]

   Each student receives $\frac{1}{12}$ L of juice.
   
   b. How many more liters of juice will Ms. Hayes need if she wants to give each of the 24 students in her class the same amount of juice found in Part (a)?

   \[
   \frac{1}{12} \times 24 = \frac{24}{12} = 2 \text{ L}
   \]

   Ms. Hayes will need 2 L total.

   \[
   2L - \frac{1}{2}L = \frac{1}{2}L
   \]

   She will need $\frac{1}{2}$ L more of juice.

2. Lucia has 3.5 hours left in her workday as a car mechanic. Lucia needs $\frac{1}{2}$ of an hour to complete one oil change.
   a. How many oil changes can Lucia complete during the rest of her workday?

   \[
   \frac{3 \frac{1}{2}}{\frac{1}{2}} = \frac{7}{2} \times 2 = \frac{14}{2} = 7
   \]

   She can complete 7 oil changes.

   b. Lucia can complete two car inspections in the same amount of time it takes her to complete one oil change. How long does it take her to complete one car inspection?

   \[
   \frac{1}{2} \text{ hr} \div 2 \text{ insp.} = \frac{1}{2} \times \frac{1}{2} = \frac{1}{4} \text{ hr}
   \]

   It takes her $\frac{1}{4}$ hour to complete an inspection.

   c. How many inspections can she complete in the rest of her workday?

   \[
   \frac{3 \frac{1}{2}}{\frac{1}{4}} = 3 \frac{1}{2} \times 4 = \frac{7}{2} \times 4 = \frac{28}{2} = 14
   \]

   She can complete 14 inspections in $3 \frac{1}{2}$ hrs.
3. Carlo buys $14.40 worth of grapefruit. Each grapefruit costs $0.80.
   
   a. How many grapefruits does Carlo buy?
   \[
   14.40 \div 0.80 = 14 \frac{4}{10} \div \frac{8}{10} = \frac{144}{10} \times \frac{10}{8} = \frac{144}{8} = 18
   \]
   Carlo bought 18 grapefruits.

   b. At the same store, Kahri spends one-third as much money on grapefruits as Carlo. How many grapefruits does she buy?
   \[
   \frac{1}{3} \times 14.40 = \frac{1}{3} \times \frac{144}{10} = \frac{144}{30} = 4.80
   \]
   Kahri spent $4.80, so she bought 6 grapefruits.

4. Studies show that a typical giant hummingbird can flap its wings once in 0.08 of a second.
   
   a. While flying for 7.2 seconds, how many times will a typical giant hummingbird flap its wings?
   \[
   7.2 \div 0.08 = \frac{72}{10} \div \frac{8}{100} = \frac{720}{81} = 90
   \]
   It will flap its wings 90 times in 7.2 seconds.

   b. A ruby-throated hummingbird can flap its wings 4 times faster than a giant hummingbird. How many times will a ruby-throated hummingbird flap its wings in the same amount of time?
   \[
   90 \times 4 = 360
   \]
   A ruby-throated hummingbird will flap its wings 360 times in 7.2 seconds.
5. Create a story context for the following expression.

\[
\frac{1}{3} \times (\$20 - \$3.20)
\]

Chris had $20. He bought a bag of pens for $3.20. Of the money remaining, he spent \(\frac{1}{3}\) of it on notebooks. How much money was spent on notebooks.

6. Create a story context about painting a wall for the following tape diagram.

I painted \(\frac{1}{2}\) of my bathroom wall blue. \(\frac{1}{3}\) of the blue wall was covered in red paint. How much of the wall is red?