1.3 Time to Concentrate

Scaling Ratios

In Problem 1.2, you may have used the ratios below to determine which recipe was the most "orangey." Below are two ratios describing Mix A.

two cups of concentrate to three cups of water

2 : 3 or $\frac{2}{3}$

OR

two cups of concentrate to five cups of juice

2 : 5 or $\frac{2}{5}$

The first ratio is a **part-to-part ratio.** It compares one part (the water) of the whole (the juice) to the other part (the concentrate). The second ratio is a **part-to-whole ratio.** It compares one part (the concentrate) to the whole (the juice).

For Mix B, you can write the part-to-part ratio as 5 cups concentrate to 9 cups water, or 5 : 9, or $\frac{5}{9}$. You can write the part-to-whole ratio as 5 cups concentrate to 14 cups juice, or 5 : 14, or $\frac{5}{14}$.

Scaling ratios was one of the comparison strategies Sam used in Problem 1.2. He wrote

Part-to-Part Ratio for Mix A

$$\frac{\text{2 cups concentrate}}{\text{3 cups water}} = \frac{\text{4 cups concentrate}}{\text{6 cups water}} = \frac{\text{6 cups concentrate}}{\text{9 cups water}}$$

Part-to-Part Ratio for Mix B

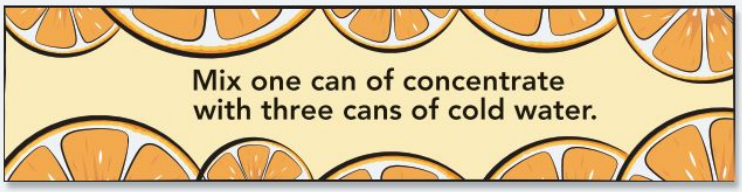
$$\frac{\text{5 cups concentrate}}{\text{9 cups water}}$$

- How could Sam use these ratios to compare the Mix A and Mix B recipes?

In the next Problem you will look at several more mixes for orange juice and lemonade.

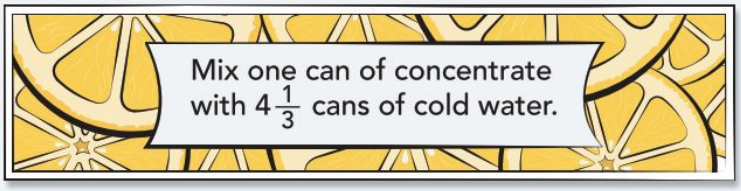
Problem 1.3

A A typical can of orange juice concentrate holds 12 fluid ounces. The standard recipe is shown below.



How large a pitcher will you need to hold the juice made from a typical can? Show or explain how you arrived at your answer.

B A typical can of lemonade concentrate holds 12 fluid ounces. The standard recipe is shown below.



1. How large a pitcher will you need to hold the lemonade from a typical can? Show or explain how you arrived at your answer.
2. The pitchers below hold $\frac{1}{2}$ gallon, 60 ounces, and 1 gallon. Which container should you use for the lemonade from one can? Explain your reasoning.
   Note: 1 gallon = 128 ounces

continued on the next page >

Problem 1.3 continued

C Solve these mixing problems.

1. **a.** Cece is making orange juice using one 16-ounce can of concentrate. She is using the standard ratio of one can of concentrate to three cans of cold water. How large a pitcher will she need?

   b. Olivia has a one-gallon pitcher to fill with orange juice. She uses the standard ratio of one can of concentrate to three cans of cold water. How much concentrate does she need?

2. August has some leftover cans of lemonade concentrate in his freezer. He uses $1\frac{1}{2}$ ten-ounce cans of concentrate and the standard ratio of one can of concentrate to $4\frac{1}{3}$ cans of cold water. How large a pitcher does he need?

D Otis likes to use equivalent ratios. For Olivia's problem in Question C, part (1), he wrote ratios in fraction form:

$$\frac{1}{4} = \frac{x}{128}$$

1. What do the numbers 1, 4, and 128 mean in each ratio? What does x mean in this *equation*?
2. How can Otis find the correct value of x?

ACE Homework starts on page 19.