Comparing Ratios
Another Approach

Many adults would solve the three rate problems from the video by finding the unit price, or price per one can or one ounce. One way to find the unit price is to use division as shown below.

Problem 1: A 6-pack of root beer costs $3.67, a 12-pack costs $4.00, and a 24-pack costs $5.99. Which package of root beer is the best buy?

Find the unit price, or price for one can of root beer, using division.

$3.67 ÷ 6 ≈ $0.61 $4.00 ÷ 12 ≈ $0.33 $5.99 ÷ 24 ≈ $0.25

Problem 2: A 14 oz. box of cereal costs $2.78, and the 18 oz. box costs $3.06. Which box of cereal is the better buy?

Find the unit price, or price for one ounce of cereal, using division.

$2.78 ÷ 14 ≈ $0.20 $3.06 ÷ 18 = $0.17

Problem 3: A 24 oz. bottle of ketchup costs $2.09, a 32 oz. bottle costs $2.39, and a 64 oz. bottle costs $4.99. Which bottle of ketchup is the best buy?

Find the unit price, or price for one ounce of ketchup, using division.

$2.09 ÷ 24 ≈ $0.09 $2.39 ÷ 32 ≈ $0.07 $4.99 ÷ 64 ≈ $0.08

Another common way to solve this type of problem is to set up a proportion and use *cross multiplication* or *cross products* to find the unit price. Problem 1 is solved with cross multiplication below. Notice that this method results in the same division problems used to solve problem 1 above.

Set up proportions using the information from the problem.

$$\frac{6 \text{ cans}}{\$3.67} = \frac{1 \text{ can}}{x \text{ dollars}} \qquad \frac{12 \text{ cans}}{\$4.00} = \frac{1 \text{ can}}{x \text{ dollars}} \qquad \frac{24 \text{ cans}}{\$5.99} = \frac{1 \text{ can}}{x \text{ dollars}}$$

Use cross multiplication to solve for x.

$$\frac{6 \text{ cans}}{\$3.67} \times \frac{1 \text{ can}}{x \text{ dollars}} \qquad \frac{12 \text{ cans}}{\$4.00} \times \frac{1 \text{ can}}{x \text{ dollars}} \qquad \frac{24 \text{ cans}}{\$5.99} \times \frac{1 \text{ can}}{x \text{ dollars}}$$

$6x = $3.67 $12x = $4.00 $24x = $5.99

$x ≈ $0.61 $x ≈ $0.33 $x ≈ $0.25

Both methods of finding unit prices are accurate and useful procedures for comparing rates, but not always the most efficient. For example, you could compare the root beer prices by *chunking*, or looking at the price of a group of cans. Twelve cans cost $4.00. At that rate, six cans cost $2.00 and 24 cans cost $8.00. The 12-pack is a better buy than the 6-pack, because buying one 6-pack costs more than $2.00. The 24-pack is the best buy, because it costs less than buying two 12-packs for $8.00.

Students who understand proportional relationships can flexibly use a variety of reasoning strategies to compare rates. These students do not think solely in unit rates but rather select strategies that fit a given situation. Learning a variety of reasoning strategies helps students solve problems accurately and efficiently, recognize when answers make sense, and develop number sense in the process.