Comparing Ratios
A Closer Look at the Video

After watching the *Comparing Ratios* video, make sense of the mathematics by taking a closer look at the problem situation and solutions. Use the questions and comments in bold to help you compare ratios and solve the problems.

A ratio is a comparison of any two quantities. When shopping, you can express the size of an item and the cost of an item as a ratio. Comparing ratios can help you determine the best buy.

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?

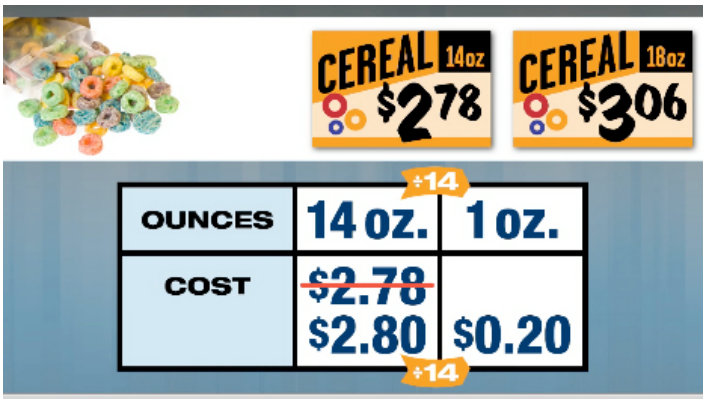
How can you determine the best buy using number sense and estimation? One way is to start with the 12-pack. The 12-pack costs $4.00. **What would a 6-pack cost at this rate?** A 12-pack is equal to two 6-packs. If you pay $4.00 for two 6-packs, each 6-pack would cost $2.00. This is less than $3.67, the cost of one 6-pack, so the 12-pack is the better buy.

Now compare the cost of the 12-pack to that of the 24-pack. A 24-pack is the same as two 12-packs. It would cost 2 times $4.00, or $8.00, to buy two 12-packs. The 24-pack is the better buy because it costs $5.99. In fact, the 24-pack is the best buy of all.

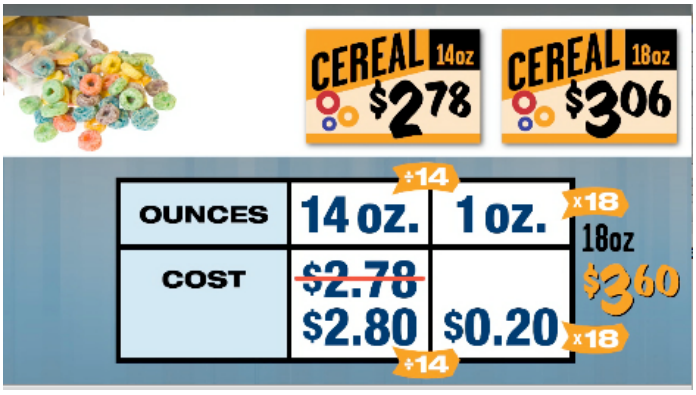
MakingSense

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?

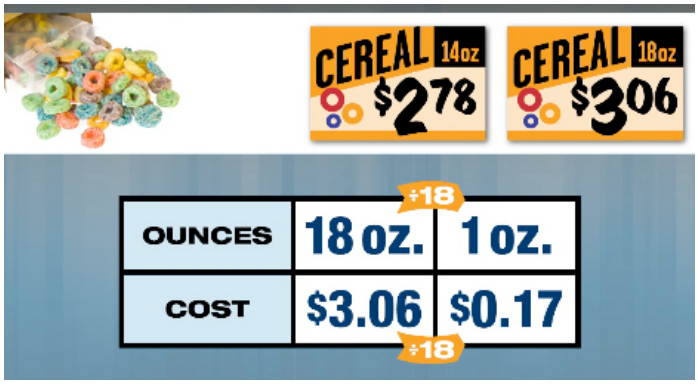
How can you determine which is the better buy? One way to compare the prices is to find the unit price or the price per ounce for each box of cereal. In order to find the unit price you must divide the price by the number of ounces. The 14 oz. box of cereal costs $2.78. If you round the cost up to $2.80, it is easier to divide by 14. $2.80 divided by 14 is $0.20. One ounce of the 14 oz. box of cereal costs about $0.20.



If the unit price was the same for both boxes of cereal, the cost of the 18 oz. box would be 18 oz. times $0.20, or $3.60. The 18 oz. box costs $3.06, so it is the better buy.



You could also use a calculator to compare the unit costs for each box of cereal. The unit cost for the 14 oz. box is about $0.20 as shown above. The unit cost for the 18 oz. box of cereal is $3.06 ÷ 18 or $0.17 per ounce. This also shows that the 18 oz. box of cereal is the better buy.



Problem 3: Saffron is one of the most expensive items in the grocery store. A bottle of saffron containing 3/100 oz. costs $15.99. How much would 1 oz. of saffron cost?

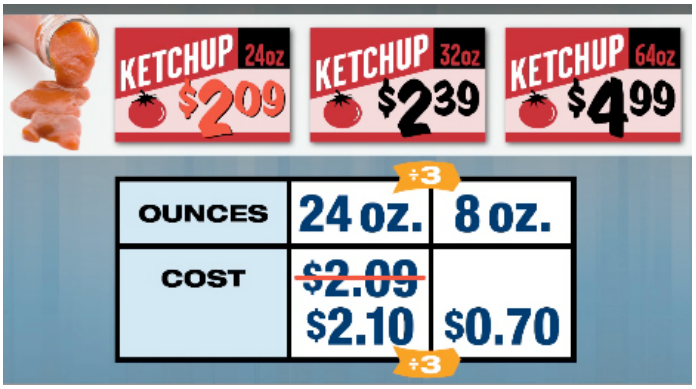
How many containers of saffron would you need in order to have one ounce? You would need about 33 containers of saffron to equal 1 oz., because 33 times 3 hundredths equals 99 hundreds, which is very close to one. **What is the cost of 33 containers of saffron at $15.99 a container?** $15.99 is close to $16.00. 33 times 16 equals $528, so saffron costs about $528 per ounce.

$$\frac{33}{100} \times 33 = \frac{99}{100}$$

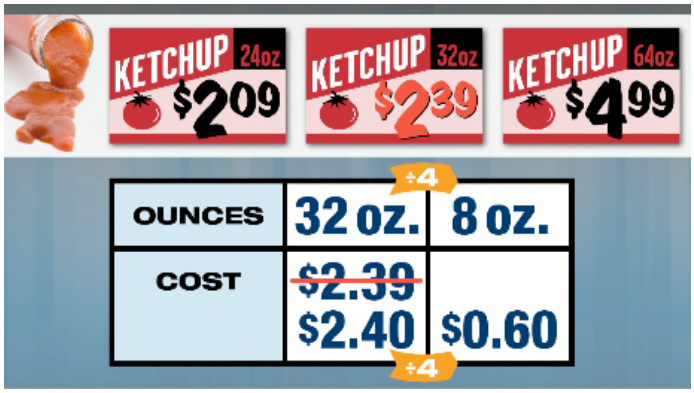
$$33 \times \$16 = \$528$$

Problem 4: 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?

Without determining the cost of each ounce of ketchup, how could you compare the costs of the three bottles? Since the number of ounces in each bottle of ketchup is a multiple of eight, one way to solve this problem would be to determine the cost of 8 oz. for each of the different bottles. **Use estimation and mental math to find the cost of 8 oz. of ketchup from the 24 oz. bottle.** 24 ÷ 8 = 3, so divide both the number of ounces and the cost by 3. You can round the cost up to $2.10, since $2.10 is evenly divisible by 3. Dividing $2.10 by 3 gives you 70¢ for 8 oz.



Now find the cost of 8 oz. of ketchup from the 32 oz. bottle. 32 ÷ 8 = 4, so divide both the number of ounces and the cost by 4. Rounding this cost up to $2.40 and then dividing by 4 gives you 60¢ for 8 oz. The 32 oz. bottle of ketchup is the better buy.



Is the 32 oz. bottle or the 64 oz. bottle the better buy? You could find the cost of 8 oz. of ketchup from the 64 oz. bottle but it might be easier to simply find half the cost of the 64 oz. bottle. $4.99 is close to $5.00 and half of $5.00 is $2.50. The cost of the 32 oz. bottle is $2.39. You get half the amount of ketchup with the 32 oz. bottle but the cost of the 32 oz. bottle is less than half the cost of the 64 oz. bottle. This information indicates that the 32 oz. bottle would be the best buy.

If you understand proportional relationships, you can flexibly use a variety of reasoning strategies to compare rates. Do not think solely in unit rates, but rather select strategies that fit a given situation. Learning a variety of reasoning strategies will help you solve problems accurately and efficiently, recognize when answers make sense, and develop number sense in the process.