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Consumer Numeracy

Suggested grade levels: 7 and up.

Possible subject areas: Social studies, economics.

Math skills: Arithmetic. Area of a rectangle and a circle. Conversion of units of measurement. Liters.

Overview: Quantitative literacy is very important when it comes to being an informed consumer. Quantitatively literate consumers understand how to select the best values and they are less likely to be cheated.

In deciding the best buy on a pizza one needs to be aware that the area of a circle is πr^2, which is the same thing as $\frac{\pi}{4}d^2$ where d is the diameter. This means that the area is proportional to the square of the radius (or the square of the diameter). Thus, doubling the diameter quadruples the area. Pizza sizes are usually given in terms of their diameters. By the way, π is about 3.14.

In considering the price of carpet, one might need to know how to convert between square feet and square yards. (One square yard is nine square feet.) Other conversions are useful as well, such as between liters and ounces (one liter is about 33.82 ounces).

Student Activities: Consumer Numeracy

1. In selling carpet, some stores will advertise the price per square foot and others may use square yards. Acme offers a carpet for $15 per sq. yd and Ace offers the same one for $1.75 per sq. foot. Which is the better buy?

2. Soft drinks are commonly sold in six packs of 12-ounce cans and in two-liter bottles. Knowing that one liter is about 33.82 ounces, try to estimate which is the greater volume: a six-pack or two liters.

3. A store offers a 2-liter bottle of soft drink for $1.15 or a six-pack of 12-ounce cans for $1.20. Knowing that one liter is about 33.82 ounces, which is the better value (price per ounce)?

4. Shoppers often assume that the larger sizes are the better buys on a cost per unit basis. Let's look at an example: Liquor is commonly sold in three sizes: ¾ liter bottles, one-liter bottles, and 1 ¾ liter bottles. Suppose a ¾ liter bottle sells for $5.50, a one-liter bottle for $6.50, and a 1 ¾ liter bottle for $12.50? Without using

a calculator or doing any dividing, can you decide whether the 1 ¾ liter size is the best buy?

5. Which is the better value, a ¾ liter bottle at $5.50, a one-liter bottle at $6.50, or a 1 ¾ liter bottle at $12.50?

How do you figure the best value when buying a pizza? The following table was taken from an actual pizza shop. (We're assuming all these pizzas are the same thickness. If one pizza is thicker than another, that may be a factor in deciding the better buy.)

How Many People?	Pizza Size	1 Topping	2 Topping	3 Topping
SERVES 1-2	10"	$ 6.50	$ 7.25	$ 8.00
SERVES 2-3	12"	$ 9.15	$ 10.15	$ 11.15
SERVES 3-4	14"	$ 12.50	$ 13.75	$ 15.00
SERVES 5-6	Two 12"	$ 18.30	$ 20.30	$ 22.30
SERVES 7-8	14" & 12"	$ 21.65	$ 23.90	$ 26.15
SERVES 8-10	20" (or two 14")	$ 23.95	$ 24.95	$ 25.95

6. Does one 20" pizza provide the same amount of food as two 10" pizzas?

7. In the last row of the table, which option provides more pizza: one 20" or two 14"?

8. Which is the better price per square inch: a 10 inch 3 topping pizza or a 20 inch 3 topping pizza? Hint: remember that if you double the diameter, you quadruple the area.

Instructor's Sheet

1. Acme is the better buy. It is $1.67 per sq. ft. To convert square yards to square feet, divide by 9.

2. A six-pack is 12 times 6 = 72 ounces while a 2-liter bottle is 2 times 33.82 = 67.6 ounces.

3. Using the information in problem 2, a six-pack is 1.67 cents per ounce is the better value. A 2-liter bottle is 1.70 cents per ounce.

4. If both the ¾ liter bottle and one-liter bottle cost more per liter than the 1 ¾ liter bottle, then the sum of the two prices should exceed the price of the 1 ¾ liter bottle. Since $5.50 plus $6.50 is $12.00 and a 1 ¾ liter bottle costs $12.50, one of the two smaller sizes must be a better buy than the large size.

5. The prices per liter are $7.33, $6.50 and $7.14 respectively so the 1-liter bottle is the best buy.

6. Does one 20" pizza provide the same amount of food as two 10" pizzas? No, it supplies about 2 times as much. The area is proportional to the square of the diameter, so if the diameter is doubled, the area quadruples. Thus a 20’ pizza has 4 times the area of one 10” pizza.

7. In the last row of the table, which option provides more pizza: one 20" or two 14"? A 20 inch pizza has about 314 square inches of area while two 14 inch pizzas have about 308 square inches of area. So one 20" pizza is slightly larger.

8. The 20" is better. To equal its area you would need four 10" pizzas, which would cost $32.00 - far more than $25.95 for the 20".