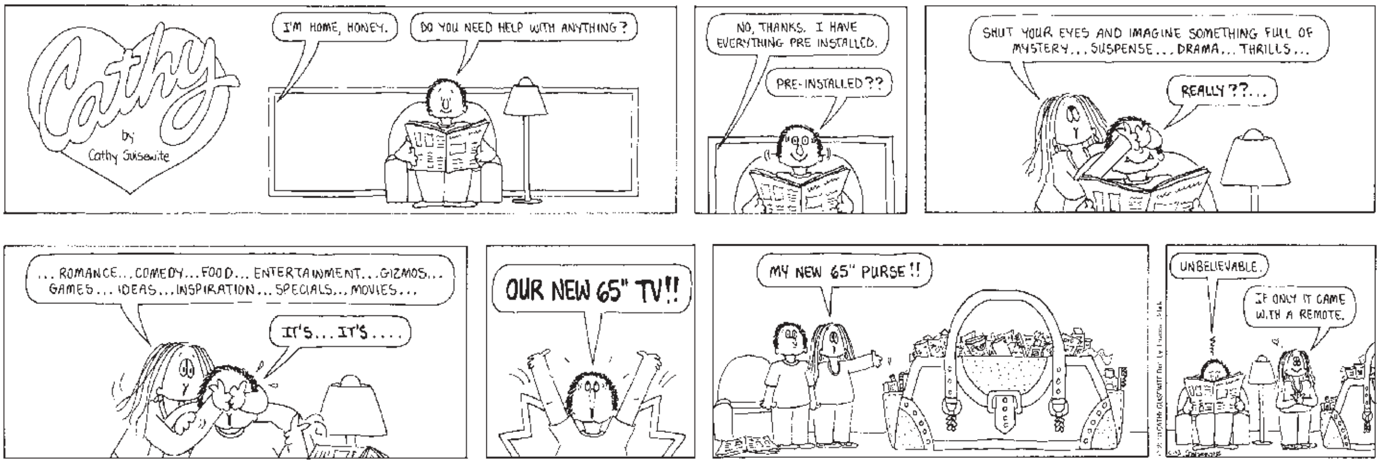
cartoon corner

Name ______________________



THE GIANT PURSE

1. What is the average height of the typical adult female?

2. Measure Cathy's height in the second to last frame (in cm). Using your answer for question 1 and Cathy's height, estimate the actual measurements of the following:

a. The height of the front of the purse (ignore the handle)

b. The width of the front

3. Suppose the bottom of her purse is 20 inches deep, from front to back. How much leather would it take to make her purse? Pretend that each face, or side, of the purse is rectangular and ignore the overlapping leather needed to stitch the purse together.

4. Suppose the purse were really 65 inches tall (excluding the handle) and that the ratios of all corresponding lengths were the same, as in the cartoon.

a. What would be the width of the 65 inch tall purse?

b. What would be the depth?

5. How much leather would it take to make the 65 inch purse?

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Edited by **Stephen P. Smith**, and **Peggy House**, Northern Michigan University, Marquette. Classroom teachers interested in field-testing or submitting a cartoon should contact **Stephen P. Smith**, stepsmit@nmu.edu. The cartoons must include the date and the newspaper syndicate that holds the copyright.

SOLUTIONS

(*Answers may vary based on student estimations.*)

1. The average height of U.S. females between 20 and 29 is about 5 ft. 4 1/2 in. (or 64.5 in.).

2. In the cartoon, we estimate that Cathy is about 1.5 cm tall and the purse is about 1 cm tall. (You could also measure in inches to give your students more practice with operations using fractions.)

a. Since 1 cm is 2/3 of 1.5 cm, the purse would be (2/3) × (64.5 in.) = 43 in. high.

b. The pictured purse is about 3 cm wide, which is twice Cathy's height, so the purse is (2) × (64.5 in.) = 129 in. wide.

3. Estimate the amount of leather to make the purse.

Area of front	43 in. × 129 in. = 5547 in.^{2}
Area of back	43 in. × 129 in. = 5547 in.^{2}
Area of bottom	20 in. × 129 in. = 2580 in.^{2}
Area of left side	20 in. × 43 in. = 860 in.^{2}
Area of right side	20 in. × 43 in. = 860 in.^{2}

Adding the areas, we find that it would take

$$2(5547) + 2580 + 2(860) = 15{,}394 \text{ in.}^2$$

of leather to make the pictured purse. Students might find this to be a rather large number. They could convert the dimensions to feet (e.g., 129 inches is 10 3/4 feet) and find the surface area of the purse (or divide 15,394 by 144—the number of square inches in a square foot). You might also ask students to compute the surface area both ways. Many students will divide 15,394 by 12, since there are 12 inches in a foot. This scenario could promote a valuable discussion on metric versus customary units of measure.

4. **a.** To find the width, construct and solve the following proportion, where x represents the width:

$$\frac{65}{43} = \frac{x}{129}$$
$$43x = 65 \times 129$$
$$43x = 8385$$
$$x = \frac{8385}{43} = 195 \text{ in.}$$

b. To find the depth, construct and solve the following proportion, where y represents the depth:

$$\frac{65}{43} = \frac{y}{20}$$
$$43y = 65 \times 20$$
$$43y = 1300$$
$$y = \frac{1300}{43} \approx 30 \text{ in.}$$

5. To find the total area of the purse:

Area of front	65 in. × 195 in. = 12,675 in.^{2}
Area of back	65 in. × 195 in. = 12,675 in.^{2}
Area of bottom	30 in. × 195 in. = 5850 in.^{2}
Area of left side	30 in. × 65 in. = 1950 in.^{2}
Area of right side	30 in. × 65 in. = 1950 in.^{2}

Adding the areas, we find that it would take

$$2(12{,}675) + 5850 + 2(1950) = 35{,}100 \text{ in.}^2$$

of leather to make the purse. Again, students might convert to square feet and compute the surface area using this unit of measure, as well.

OTHER IDEAS

- If students are familiar with the Pythagorean theorem, they could start by assuming that the 65-inch measure is the diagonal of the purse (as television screens and computer screens are measured). Using this number, they could estimate the reasonable height and width for the pictured purse.
- This activity could also be the basis for developing ideas of similarity, scale, and scale factor.
- Although the purse is not really a rectangular prism (and the sides do not go all the way to the top), students could also use this activity to explore volume.