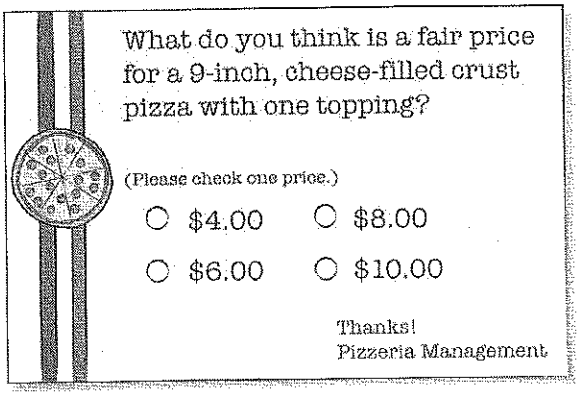
Name Key

A pizzeria plans to sell three sizes of its new pizza with cheese in the crust. A small pizza will be 9 inches in diameter, a medium will be 12 inches in diameter, and a large will be 15 inches in diameter.

The owner surveyed her lunch customer's to find out what they would be willing to pay for a small pizza.



She found that $6 was a fair price for a 9 inch pizza with one topping. Based on this price, the owner wants to find fair prices for 12- and 15-inch pizzas with one topping.

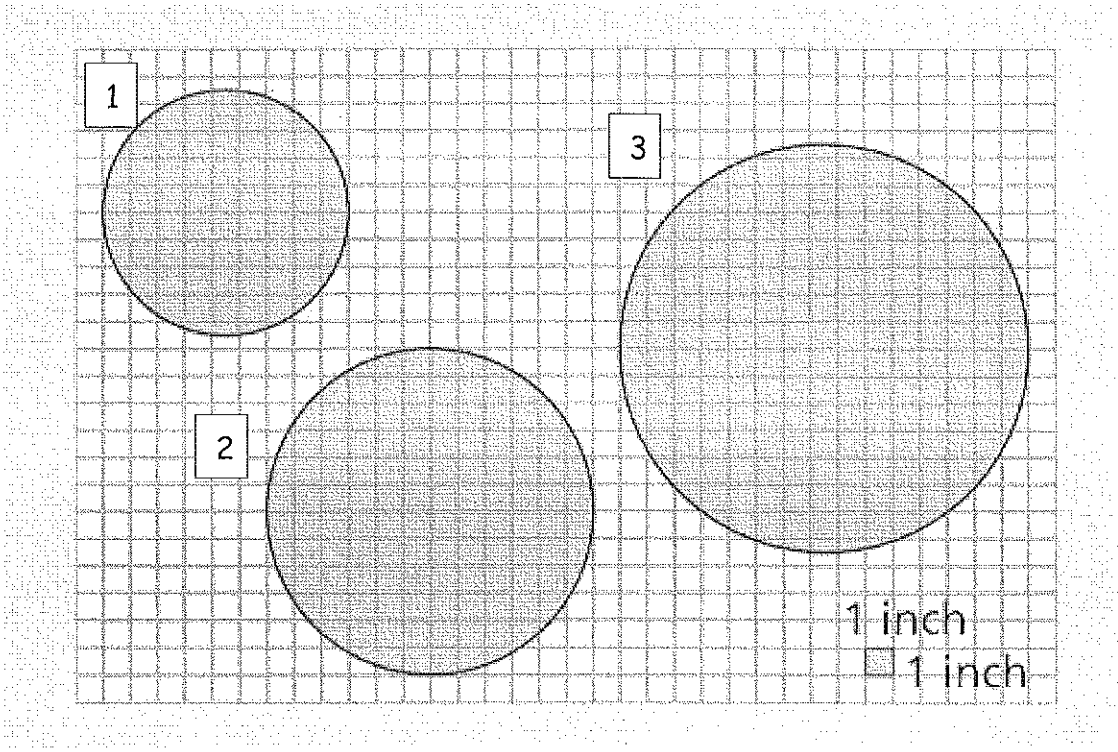
What prices would you suggest for the larger pizza?

Answers will vary

One of the cooks suggest making the difference in prices match the difference in pizza diameters, but the owner disagrees. She says that area is the best measurement to use to set the prices. She also says that comparing areas would suggest different prices from comparing diameters. Together, the cook and the owner wonder about eh following question:

Let's try and find the relationship, if any, between the diameter or radius of a circle and its area?

To answer this question, the owner uses the scale models of the different size pizzas show below.



A. Find at least two different ways as you can to estimate the area of each pizza. For each method, give your estimate for the area and describe how you found it. Study your results from Question A. Look for a pattern relating the circumference and the diameter. Test your ideas on some other circular objects. Answers will vary.

1ST Method- Describe how you found your estimates. I counted each full box inside the circles and the estimated the others.

1) Estimate: 50 2) Estimate: 100 3) Estimate: 150

2ND Method- Describe how you found your estimates. I drew a square around each circle and then found the area of the square. I subtract the extra squares that were not included in the circle.

1)Estimate: 65 2) Estimate: 112 3) Estimate: 177

9 x 9 = 81 12 x 12 = 144 16 x 16 = 256

- 16 - 32 - 64

65

B. Fill in the table below. Record each pizza's diameter, radius and your estimate of its area.

Size	Diameter(in.)	Radius (in.)	Area ($in.^2$)
Small	9	4.5	≈ 65
Medium	12	6	≈ 113
Large	15	7.5	≈ 177

C. Do you agree with the cook and compare the changes in the diameter of the pizzas to determine the price? OR Do you agree with the owner and you should compare the changes in the area of the pizzas to determine the price? COOK or OWNER

Circle your choice and then prove your case.

Comparing areas

$\frac{113}{65} \approx 1.74$ then $1.74 \times \$6 = \$10.44$

medium pizza

$\frac{177}{65} \approx 2.72$ then $2.72 \times \$6 = \$16.32$

Large pizza

Comparing diameters

$\frac{12}{9} \approx 1.33$ then $1.33 \times \$6 = \$7.98$

medium pizza

$\frac{15}{9} \approx 1.67$ then $1.67 \times \$6 = \$10.02$

Large pizza