

Let's Eat!

PIZZA PRICES

Lana and Tina were studying for their semester exam one Sunday afternoon. They needed more energy and decided to order a pizza. They called Pinky's and Primo's to compare prices.

Pinky's Prices

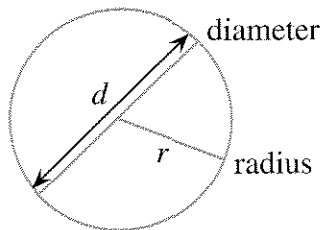
Size	Diameter	Price
small	8 in.	\$4.25
medium	12 in.	\$8.50
large	14 in.	\$10.20

Primo's Prices

Size	Diameter	Price
small	10 in.	\$6.44
medium	12 in.	\$8.84
large	14 in.	\$9.91

- Exploration** Assuming the pizzas are of the same thickness and similar quality, which is the better buy for the large pizza? The medium pizza? The small pizza? Explain, showing your calculations.

The area of a circle is given by the formula πr^2 , where r is the radius, and π is approximately equal to the number 3.1415926536.



Example: A circle having diameter 14 in. has a radius of 7 in. Its area is $\pi(7)^2$, or 49π square inches.

- Use your calculator to find the area of a circle having diameter 14 in., to the nearest tenth of a square inch. (Scientific calculators have a π key.)

Tina thought Pinky's medium pizza looked expensive. "It's twice as expensive as an 8-inch pizza," she said. "For twice as much, I ought to be able to get a 16-inch pizza."




- Find the area of a 16-inch pizza. Compare it with the area of an 8-inch pizza. How many times as large is it?
 - How many times as large is a 12-inch pizza as an 8-inch pizza? Show your calculations.
 - Comment on Tina's remark.
- Copy and complete the tables below, giving an approximation for the area of each pizza and the price per square inch.
 - Which pizza is the best buy, based on price per square inch?

Pinky's

Diameter (in.)	Area (sq in.)	Price	Price per sq in.
8	16π	\$4.25	—
12	—	\$8.50	—
14	—	\$10.20	—

Primo's

Diameter (in.)	Area (sq in.)	Price	Price per sq in.
10	—	—	—
12	—	—	—
14	—	—	—

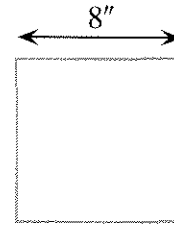
5. Compare the areas of these pizzas. How many times as big is the larger than the smaller?
- a 12-inch pizza and a 6-inch pizza
 - a 14-inch pizza and a 12-inch pizza
6.  To compare a pizza having radius r with a pizza having radius $2r$, you can use the ratios of the areas. Simplify this ratio.
- $$\frac{\pi(2r)^2}{\pi(r)^2}$$
7. **Generalization** Write and simplify the ratios to compare the area of:
- a pizza having radius r with a pizza having three times this radius;
 - a pizza having radius r with a pizza having radius kr .
-
8.  If you double the diameter of a pizza, why does the price more than double?
9.  For a party Tina was going to buy ten 8-inch pizzas from Pinky's, but she got mixed up and bought eight 10-inch pizzas from Primo's instead. Did she have the right amount of pizza, too much, or too little? Explain, showing your calculations.



BAKING BROWNIES

An hour after they had polished off their pizza, Lana and Tina were having trouble

concentrating on studying exponents. "Maybe we're just hungry," said Lana. "I'm feeling a little faint," Tina agreed. "We should probably bake some brownies."

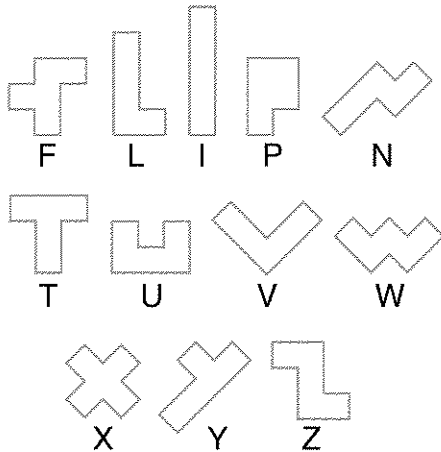
The recipe said to use an 8-inch-square pan.



- Lana wanted to double the recipe. "OK," said Tina, "but we'll need a 16-inch-square pan."
10. a. Using the same scale, make a sketch of an 8-by-8-inch pan and a 16-by-16-inch pan.
 b. How many 8-by-8 pans would fit inside a 16-by-16 pan?
 c. Comment on Tina's remark.
11.  How many times as big is the larger than the smaller square? (The measurement refers to the side length.)
- a 12-inch square and a 6-inch square
 - a 14-inch square and a 12-inch square
12. **Generalization** What is the ratio of the areas of two squares, if the ratio of the sides is
- 5?
 - k ?
-
13. 
- Write the ratio of the area of a circle having diameter s to that of a square having side s .
 - Simplify the ratio. Which is larger, the circle or the square? How many times as large is it?

PUZZLES MORE POLYOMINO TILINGS

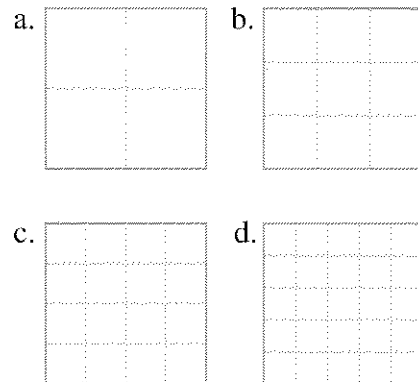
14. Draw all the tetrominoes with their dimensions doubled. Tile the blowups with the l and/or t tetrominoes.
15. Repeat with the tripled tetrominoes.



16. Draw all the pentominoes with their dimensions doubled. Tile the blowups with the P and/or N pentominoes.
17. Repeat with the tripled pentominoes.

Projects

18. Can you use the same tiles to cover bigger and bigger blown-up tetrominoes and pentominoes? Experiment and report on your discoveries.
19. What is the smallest rectangle you can tile with a given pentomino? Experiment and report on your discoveries.

REVIEW A SQUARE NUMBER OF SQUARES

Each of the four large squares has area 75. Each has been divided into a square number of smaller squares.

20. Find the area of each small square.
21. Express the side of each small square as a square root.
22. Explain why $\sqrt{75} = 5\sqrt{3}$, using
- the figure;
 - radical rules;
 - decimal approximations.
23. Divide a square having area 72 into a square number of smaller squares, in such a way that you can use the figure to help write $\sqrt{72}$ in simple radical form.