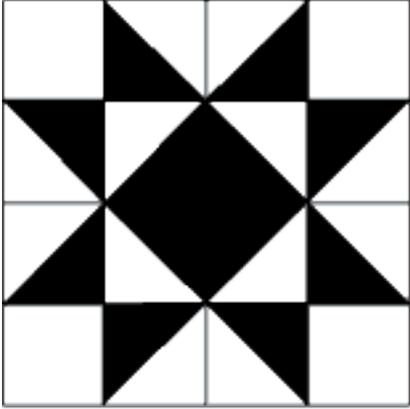Area & Perimeter

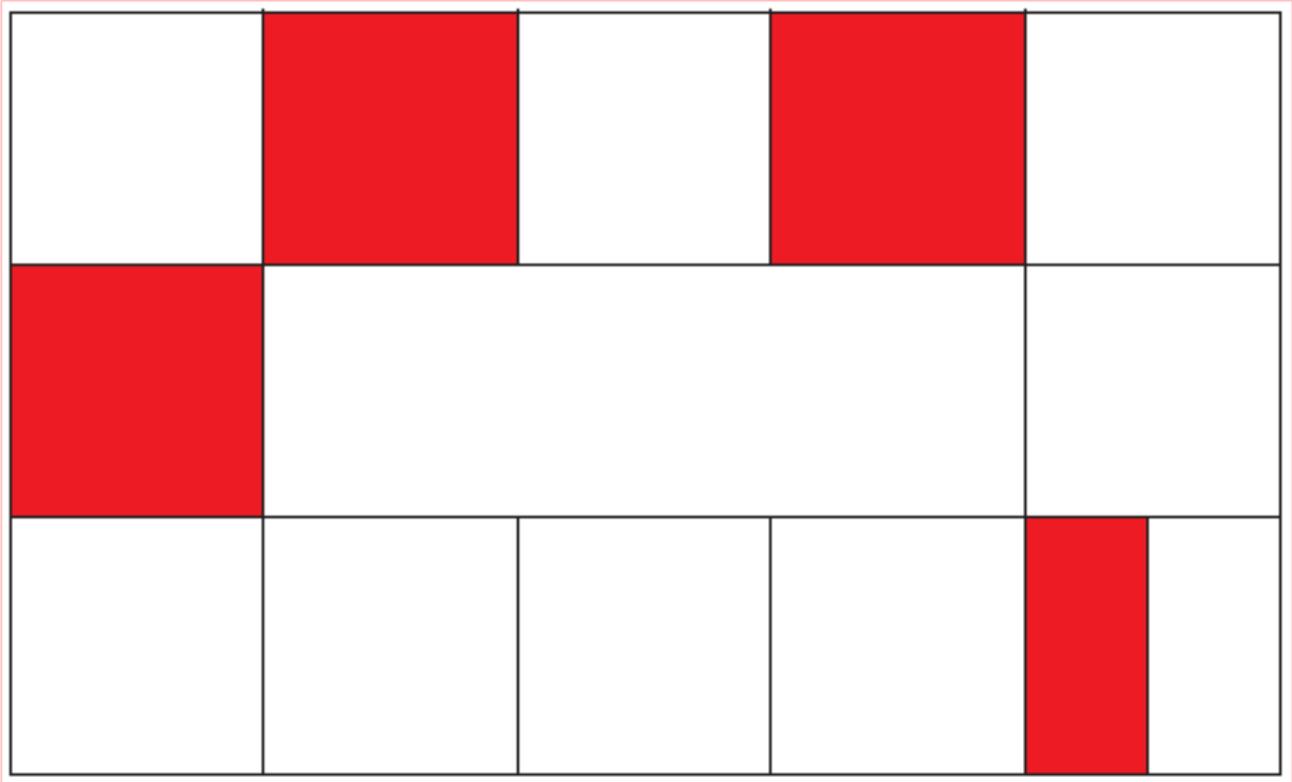| 1	Juan wants to enlarge a photograph that is 4"×6". If he wants the area of the enlargement to be four times that of the original, what should the new dimensions be?
2	A spill of 1 ton of oil covers an area of up to 12 km² on the ocean. If the thickness of the oil slick is about 1 mm, what is the volume of 1 ton of oil in cubic meters? The Exxon Valdez spilled 257,000 barrels of oil off the coast of Alaska. Each barrel contained about 160 liters. How great an area would this spill cover? How many tons of oil were spilled?
3	Lindsey used 12 cut-up drinking straws—each 2 inches long—to make the triangle on the left with an area of 24 in.². Courtney rearranged the straws (all 12) to make a figure with an area of only 12 in.². How did Courtney rearrange the straws? Hint: The figure on the right uses all 12 straws and has an area of 20 in.². 2 inches
4	In a carnival game, you can win $100 if you hit the bull's-eye with a dart. The radius of the dartboard is 9 inches, and the radius of the bull's eye is 1 inch. What is the percent chance that a random hit on the board will be a bull's-eye?
5	What do all the bases (bottom edges) of the following triangles have in common? What do all the vertices opposite the bases have in common? Describe how you would find the area of each of the triangles without using a formula. How can your work lead to a general formula for finding the area of a triangle?

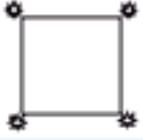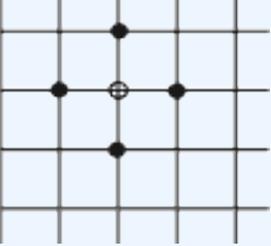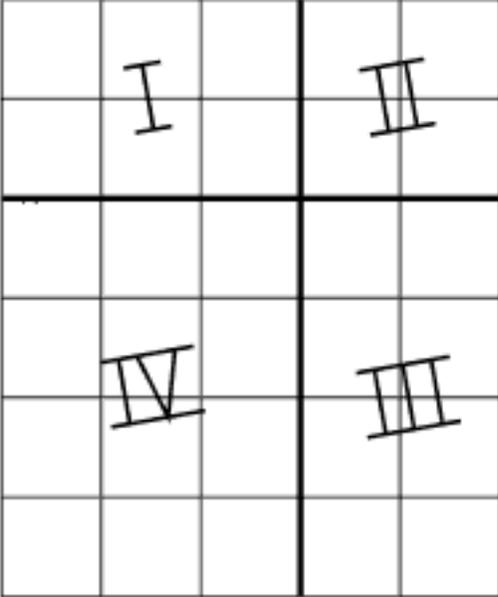| 6	Jill the lumberjack has a log in the shape of a cylinder that has a mass of 24 kilograms. What would the mass be if the log were twice as thick but only one-half as long?
7	A rectangular floor is completely covered with tiles that measure 1 m×2 m. If the tiles cannot be cut and do not overlap, which dimensions of the following are not those of this floor? Explain your reasoning. *(a)* 4 m×9 m *(b)* 8 m×8 m *(c)* 11 m×7 m
8	Approximately 7.5 gal. of water is needed to fill 1 cubic ft. of volume. Approximately how many times will a person have to fill a quart-size container to fill an aquarium that measures 2 ft.×1 ft.×6 ft.?
9	At Tony's Pizza Parlor, the diameter of a small pizza was changed from eight inches to twelve inches. The new size will have eight slices instead of the original six slices. What is the increase in area of the new slice to the nearest whole percent?
10	If the area of one of the triangular "points" in the eight-point star is 1/2 square inch, what is the area of the shaded portion of the star? What are the dimensions of the entire quilt block? Eight-Point Star Four-Point Star
11	Jim wants to buy cement to anchor two posts for a swing he is building. (The illustrations below show the top views of two holes with support beams.) He has dug two round holes that are 12 inches in diameter (the circles) and 40 inches deep. He wants to fill each with concrete around a rectangular supporting beam that is 3 1/2 in. by 5 1/2 in. (the shaded rectangles). Each 80-pound bag of concrete mixes with water to make 0.6 cubic feet of concrete. How many bags of concrete must he buy for the job?
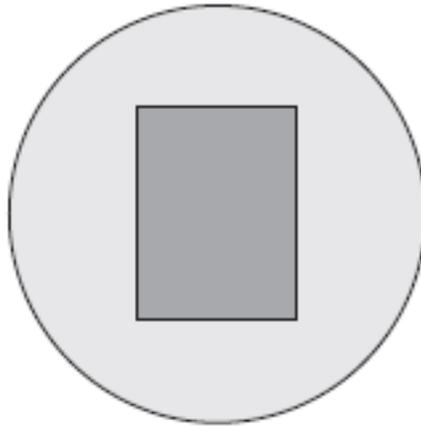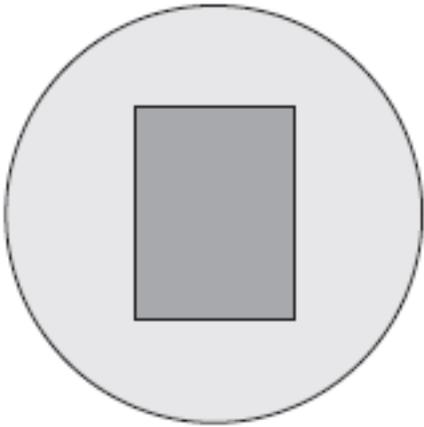
| 12 | What percentage of the figure shown here is shaded? |

| 13 | A man built a square swimming pool, 50 feet long on each side. He planted a tree on each corner of the pool, as shown below. How does the man double the area of the pool without moving the trees or changing the square shape? |

|	
14	A rectangular carpet runner has an area of 48 square meters and a perimeter of 32 meters. What are the length and width of the carpet?
15	 Go is a Japanese game in which players take turns placing black-and-white stones on the vertices of a grid to capture the territory inside. What is the largest number of points that can be captured with 12 stones?
16	 A student investigating mathematics on rectangular grids found an interesting property. He divided the rectangle by one vertical line and one horizontal line to make 4 rectangles and found that the product of the areas of rectangles I and III equals the products of the areas of II and IV. In the example here, 6 × 8 = 4 × 12. Is this scenario true for all similar divisions made on the large rectangle? Is it true for other rectangles?
17	Each step in a science museum's spiral staircase is an isosceles right triangle whose leg matches the hypotenuse of the previous step, as shown in the overhead view of the staircase. If the first step has an area of 0.5 square feet, what is the area of the

eleventh step? Challenge: Find general formulas for side length, hypotenuse, and area for step *n*.
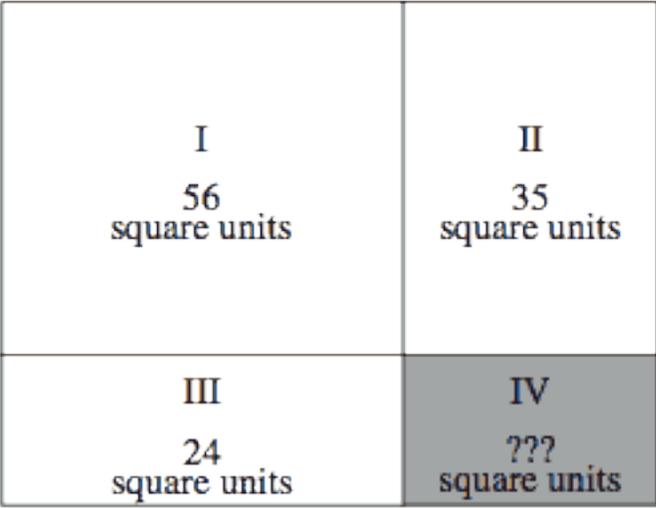
Step 3

Step 2

Step 4

Step 1

Step 5
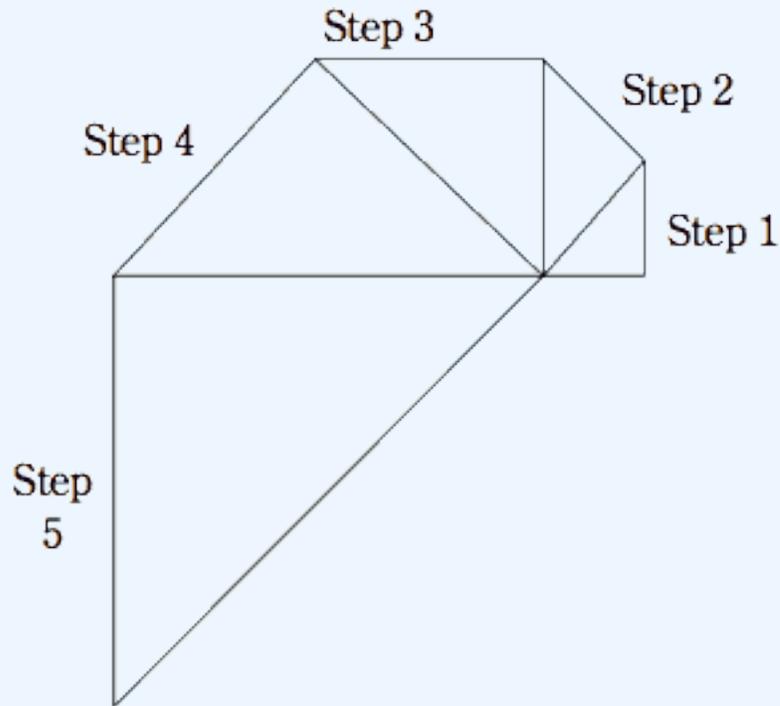
| 18 | A square is inscribed in a circle of radius 1 unit, and a larger square is circumscribed about the same circle. What is the area of the region located between the two squares?
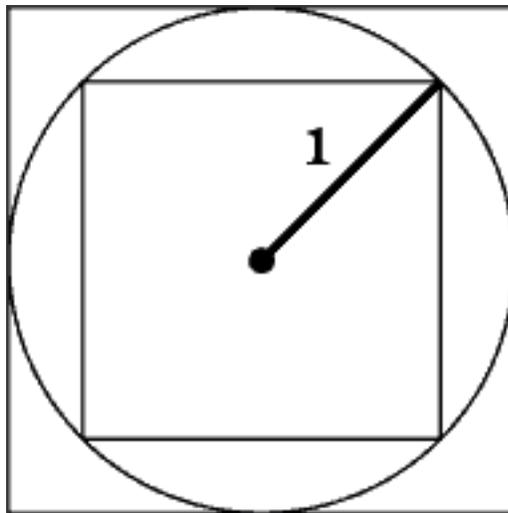
1 |

| 19 | Alex makes a 14-inch-diameter pizza, which includes a 1-inch wide crust. Donald wants to make a 10-inch-diameter pizza with the same percent of crust as Alex's pizza. To the nearest tenth of an inch, approximately how wide will be the crust on |

Area & Perimeter

	Donald's pizza?
20	See the diagram at right. *ABCD* is a rectangle. The lengths of the sides of the smaller rectangles are integer numbers of units. What is the area of rectangle IV?

Diagram labels:
A ... B
I — 56 square units
II — 35 square units
III — 24 square units
IV — ??? square units
D ... C