41. ⬆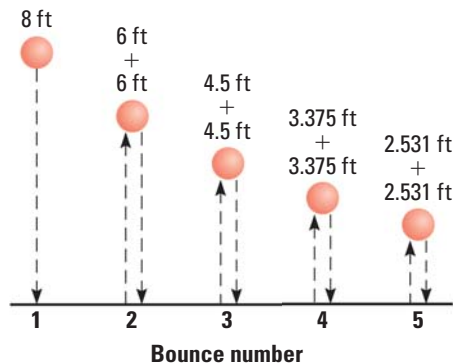️ **TAKS REASONING** A student drops a rubber ball from a height of 8 feet. Each time the ball hits the ground, it bounces to 75% of its previous height.

  a. How far does the ball travel between the first and second bounces? between the second and third bounces?

  b. Write an infinite series to model the total distance traveled by the ball, excluding the distance traveled before the first bounce.

  c. Find the total distance traveled by the ball, including the distance traveled before the first bounce.

  d. Show that if the ball is dropped from a height of h feet, then the total distance traveled by the ball (including the distance traveled before the first bounce) is $7h$ feet.

8 ft

6 ft
+
6 ft

4.5 ft
+
4.5 ft

3.375 ft
+
3.375 ft

2.531 ft
+
2.531 ft

1 2 3 4 5

Bounce number

42. **CHALLENGE** The *Sierpinski triangle* is a fractal created using equilateral triangles. The process involves removing smaller triangles from larger triangles by joining the midpoints of the sides of the larger triangles as shown below. Assume that the initial triangle has an area of 1 square unit.

Stage 1   Stage 2   Stage 3
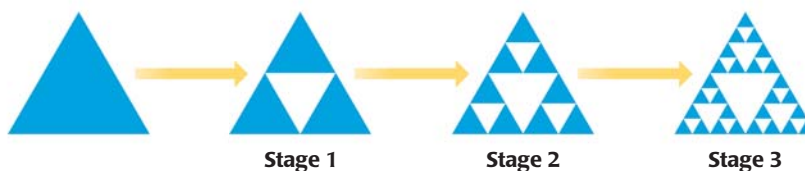
  a. Let a_n be the total area of all the triangles that are removed at stage n. Write a rule for a_n.

  b. Find $\displaystyle\sum_{n=1}^{\infty} a_n$. What does your answer mean in the context of this problem?

MIXED REVIEW FOR TAKS

43. ⬆️ **TAKS PRACTICE** Rectangle P represents 150 people who were surveyed about pet ownership. Circle D represents the 75 people who said they owned a dog. Circle C represents the 40 people who said they owned a cat. How many people do not own a dog or a cat? *TAKS Obj. 10*
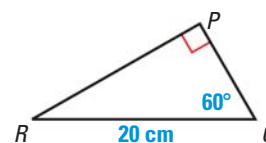
P
D   C
15
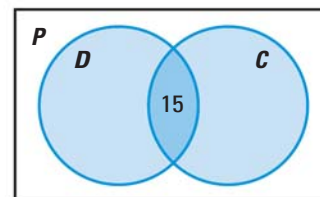
  A 20   **B** 35

  C 50   **D** 85

44. ⬆️ **TAKS PRACTICE** $\triangle PQR$ is a right triangle. What is the length of $\overline{PR}$? *TAKS Obj. 6*

  F 10 cm   **G** $10\sqrt{3}$ cm

  H $20\sqrt{3}$ cm   **J** 40 cm

P

60°

R   20 cm   Q