Area of a Circle

Extend Your Learning
Answers and Explanations

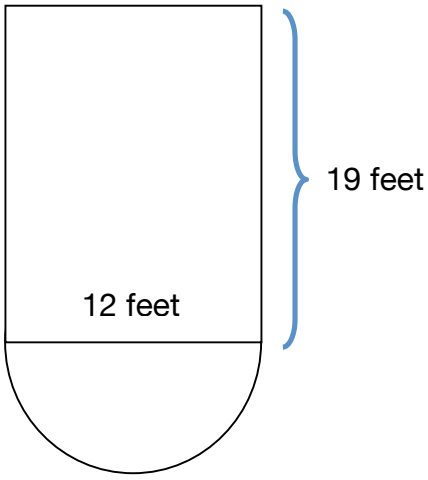
1. Connor and his family are planning to buy a trampoline. They have narrowed their search to two different trampolines, a 15-foot square trampoline or a 16-foot round trampoline. For safety, they also need to buy netting to surround the trampoline.

   a. Find the amount of netting each trampoline requires.
   The 15-foot square trampoline would need 60 feet of netting (4 • 15 ft. = 60 ft.).
   The 16-foot round trampoline would need about 50¼ feet of netting (16π ft. ≈ 50¼ ft.).

   b. Which trampoline has the greater jumping area?
   The 15-foot square trampoline would have 225 square feet of jumping area (15 ft. • 15 ft. = 225 sq. ft.). The 16-foot round trampoline would have approximately 201 square feet of jumping area (π • 8^2 sq. ft. ≈ 210 sq. ft.).

2. Taylor is getting a backyard wading pool for her birthday. Her parents want the pool to be big enough for five children, so they decided the pool should have an area of about 50 square feet. What diameter pool should they buy?
   The formula for area of a circle is $A = \pi r^2$. Divide the area, 50, by π to find r^2 (50 ÷ π ≈ 16). The square root of 16 is 4, so the radius of the pool would be about 4 feet. That would make the diameter of the pool about 8 feet. They should buy an 8-foot round wading pool.

3. The key on a basketball court is shown below. Find the total area inside the key.



The area of the rectangular region is 228 square feet (19 ft. • 12 ft. = 228 sq. ft.). The diameter of the semicircle is 12 feet, so the radius is 6 feet. The area of the circle is π times 6^2, or 36π. The area of the semicircle would be one half of 36π, or 18π (18 • π ≈ 56½ sq. ft.). The total area of the key would be the sum of the two areas (228 sq. ft. + 56½ sq. ft.). The area of the key is about 284½ square feet.

4. The Miller family has two trampolines. One is a mini-trampoline with a diameter of 36 inches. The other is a large trampoline. The jumping area of the large trampoline is 16 times greater than the jumping area of the small trampoline. What is the diameter of the large trampoline?

   Method 1: Compute the areas.
   The diameter of the mini-trampoline is 36 inches or 3 feet. The radius of the mini-trampoline is one half of the diameter, or 1.5 ft. The area is $\pi \cdot 1.5^2$ square feet, or 2.25π square feet. The area of the large trampoline is 16 times 2.25π, or 36π square feet. If the area of the large trampoline is 36π square feet, the radius squared is 36 feet. Then the radius is the square root of 36, or 6 feet. If the radius of the large trampoline is 6 feet, the diameter is 12 feet.

   Method 2: Use the relationship between linear and area measurements.
   If the area of the large trampoline is 16 times the area of the small trampoline, the diameter of the large trampoline is the square root of 16, or 4, times the diameter of the mini-trampoline. If the diameter of the mini-trampoline is 1.5 feet, the diameter of the larger trampoline is 6 feet ($4 \cdot 1.5 = 6$).

5. Alec's grandma made two apple pies. She made one pie in an 8-inch pie pan and the other in a 10-inch pie pan. She cut the 8-inch pie into 6 pieces and the 10-inch pie into 8 pieces. Alec wants the largest piece possible. Assuming both pies are the same thickness, from which pie should Alec choose a piece?
   Area of the 8-inch pie = 16π square inches (approximately 48 square inches)
   One sixth of the 8-inch pie is approximately 8 square inches ($\frac{1}{6} \cdot 48 = 8$).

   Area of the 10-inch pie = 25π square inches (approximately 75 square inches)
   One eighth of the 10-inch pie is over 9 square inches ($\frac{1}{8} \cdot 75 \approx 9.3$).
   The 10-inch pie has larger pieces than the 8-inch pie.

   OR
   Area of the 8-inch pie = 16π square inches. One sixth of the 8-inch pie is approximately 2.6π square inches.

   Area of the 10-inch pie = 25π square inches. One eighth of the 10-inch pie is approximately 3π square inches.