Math Made Easy! How to Find the Area of a Circle

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Geometry Tutorial:

Area of a Circle

When it comes to finding the area of geometric shapes, one problem that high school geometry students face is difficulty in remembering new terminology and formulas. This is especially true when it comes to the circle. New terms include: pi, radius, diameter, and circumference .

To make matters worse, the formulas for finding the area of a circle and the circumference of a circle look very similar and are often confused with one another.

Don't hurry out and find a geometry tutor just yet. This online geometry tutorial will:

- help you visualize the formula for finding the area of a circle,
- give you a *Math Made Easy!* tip on how to recognize the difference between the circle's area & circumference equations, and
- provide you with problems and solutions for finding the area of a circle.

Geometry Help Online

How to find the:

- Circumference of a Circle
- Surface Area of a Cylinder
-

Area of Circle Formula

**A = π r^2**

Geometry Circle Terms to Know:

- A: Area
- π: 3.14 (pronounced pi)
- r: radius (the distance from the center of a circle to a point on its edge)
- d: diameter (the distance across a circle going through its center; it is twice the radius)
- C: Circumference (the distance around a circle, in other words, the perimeter of the circle)
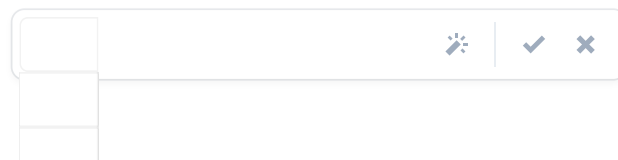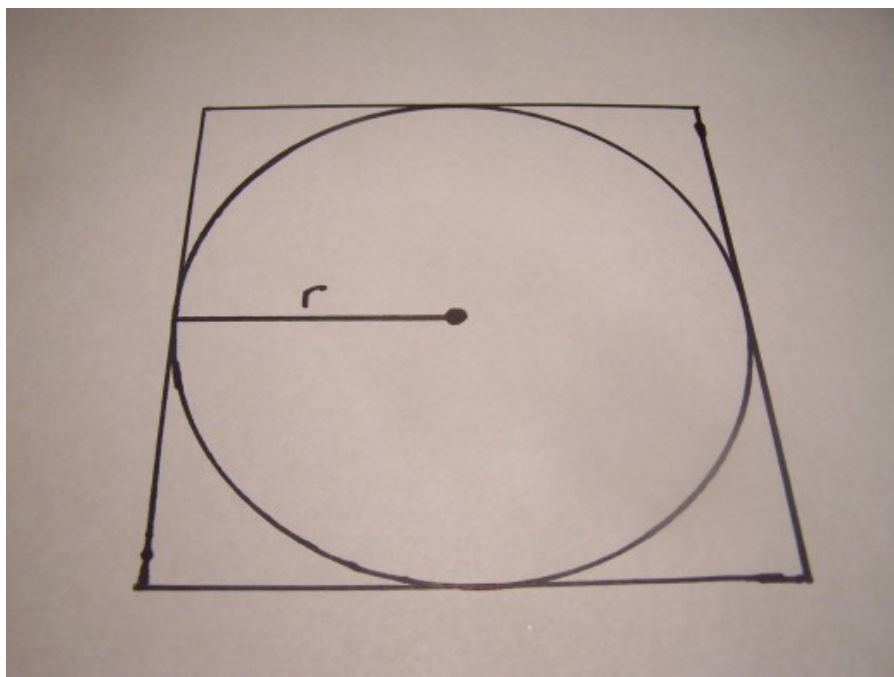
Understanding Where a Formula Comes Fro⬚akes it Easier to Remember It!
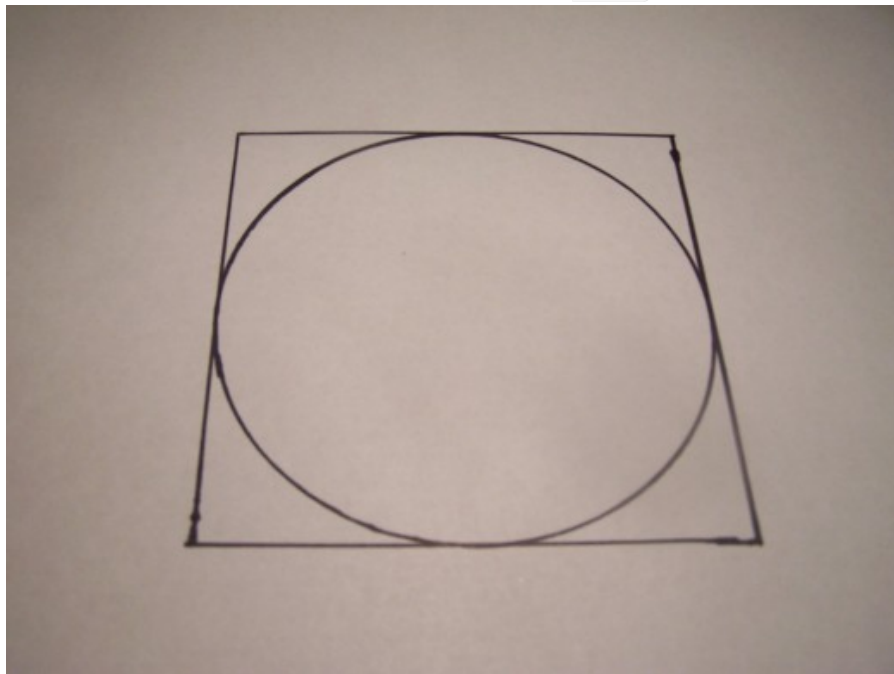
Notice the area of the circle is slightly smaller than the area of the large square in which it fits perfectly inside. | Source
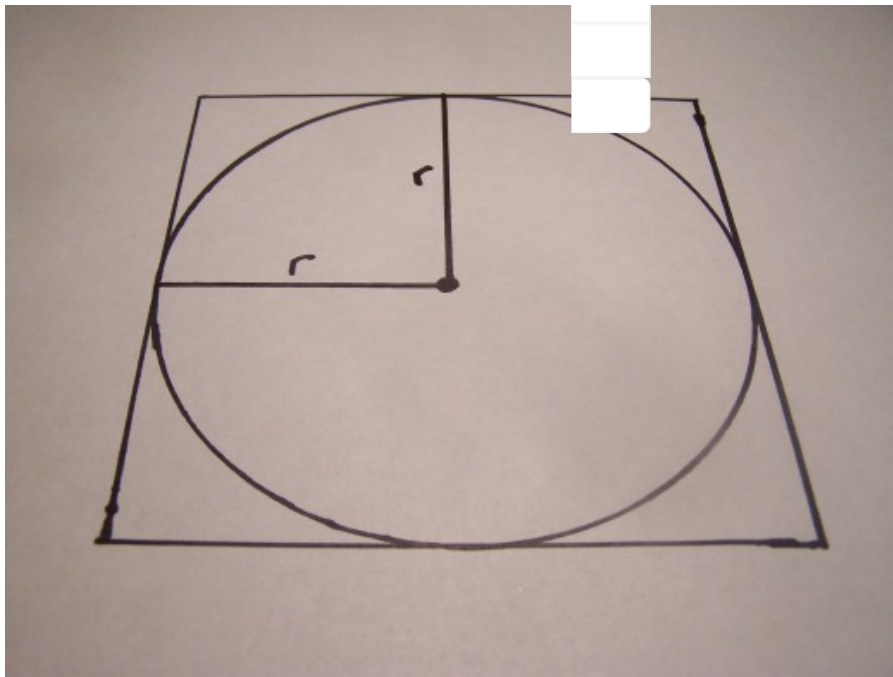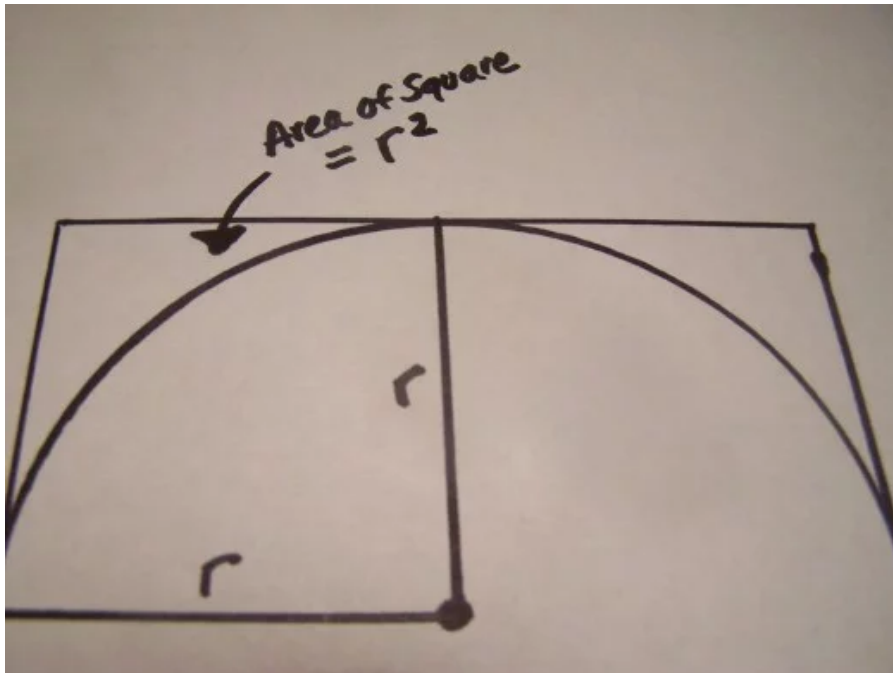

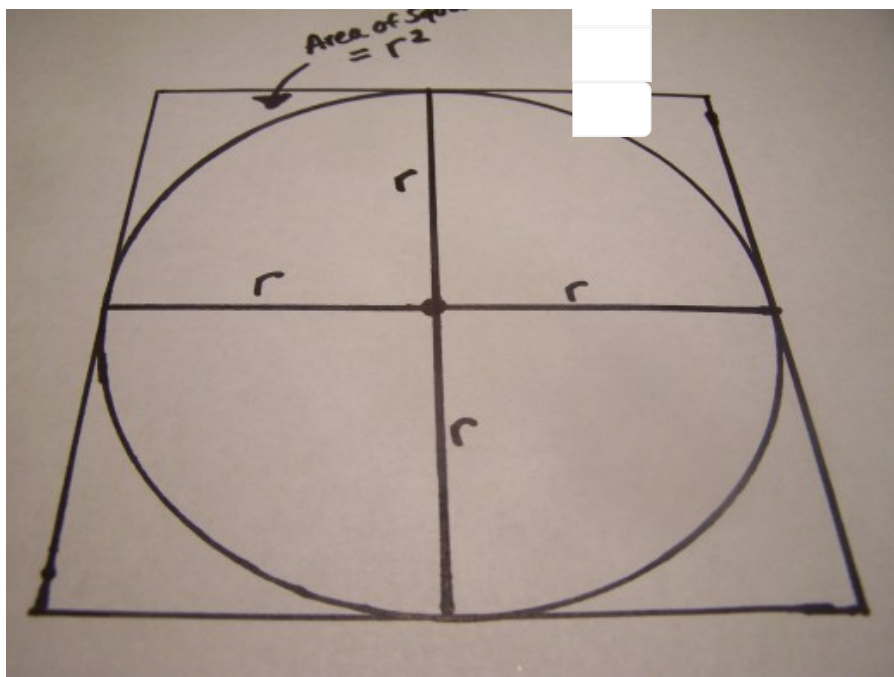*Draw a line "r" to represent the radius of the circle.* | Source

Draw another radius "r" and notice that the two radii form a small square.　　| Source
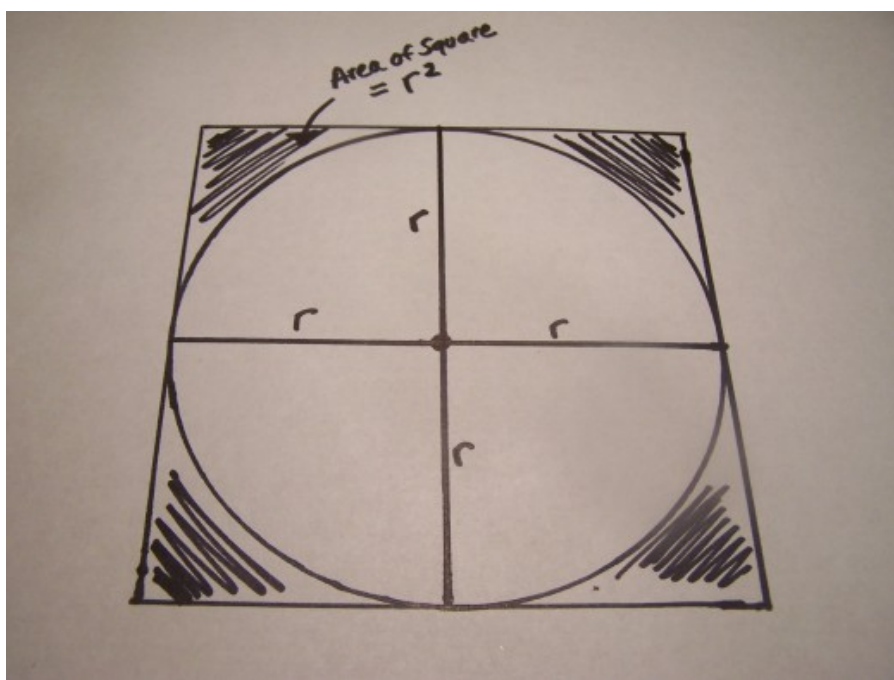

The small square has an area of r-squared.　　| Source

Draw two more radii "r" and notice that there are now 4 small squares. Since the area of one small square is 1-r-squared, the total area of the 4 small squares equals 4-r-squared. | Source

Therefore, the area of the large square is 4-r-squared. The circle's area is slightly smaller and is (3.14)-r-squared or (pi)-r-squared. |
Source

How the Equation for the Area of a Circle is Derived

Have you ever wondered why the equation of a circle is A = πr² ?

- Notice the circle which fits perfectly inside the big square. The radius of the circle is r.

- Let's draw a second radius. Notice that a small square is now formed. The lengths of each side of the small square equal r.

- The area of the small square is r^2 since the equation for the area of a squar
  the area is r times r, which simplifies to r^2. For a moment think of the area o

- Let's draw some more radii (plural of radius). Now we have 4 small squares   ch small square has an area of $1r^2$. The total area of the 4 small squares, therefore, equals $4r^2$.

- Since the 4 small squares are the same size as the 1 large square, the area of the large square is also equal to $4r^2$.

- The circle is slightly smaller than the large square so the area of the circle is less than the area of the large square. We know that the area of the square is $4r^2$ and as it turns out the area of the circle is *about* $3r^2$.

- Mathematicians know that the exact area of a circle is actually closer to $3.14r^2$ and since π = 3.14 the formula for finding the area of a circle is written as $πr^2$.
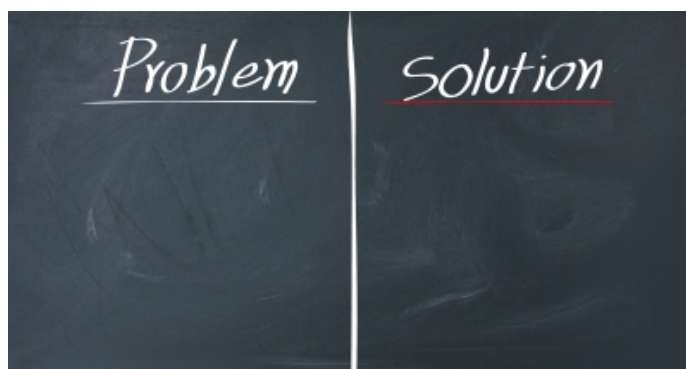
Math Made Easy! Tip

How to remember the difference between a circle's area and circumference formulas.

- Area of Circle = $πr^2$
- Circumference of Circle = $2πr$

Yikes! Both of those equations look very similar to each other. But don't worry.

There are two easy ways to remember the difference between the area of a circle equation and the circumference of a circle equation:

1. **Area is always measured in squared terms.** For example a 10 foot X 10 foot room equals 100 square feet. The area of a rectangle with sides of 5 units and 10 units equals 50 square units. You can therefore remember that the circle equation for area is the one that is squared.

2. **Visualize a circle that fits perfectly inside of a square.** Remember that the area of the square is $4r^2$ and the area of the circle is smaller, about $3r^2$.

Source

Geometry Help Online: Area of Circle

Check out three common geometry homework problems for finding the area of a circle below. Solutions and answers are provided.

Math Made Easy! Quiz - Area of Circle

Question 1/2

What is the area of a circle with a radius of 3 cm?

88.74 cm. squared

○ 28.26 cm. squared

○ 18.84 cm. squared

[next]

view quiz statistics

#1 Find the Area of a Circle Given the Radius

Problem: Find the area of a circle with a radius of 5 units.

Solution: Plug in 5 for r in the formula $A = \pi r^2$ and solve.

- $A = \pi 5^2$
- $A = 25\pi$ (*Follow the order of operations and square 5 before multiplying it by pi.*)
- $A = (25)(3.14)$
- $A = 78.5$

Answer: The area of a circle with a radius of 5 units is 78.5 square units.

#2 Find the Area of a Circle Given the Diameter

Problem: A circle has a diameter of 4 meters. What is the area of the circle?

Solution: The diameter is the measure across the circle through its center. The radius is the measure from the center of the circle to its edge. Therefore, the radius is 1/2 the diameter. Since the diameter of the circle is 4 meters, its radius is 2 meters. Plug in 2 for r in the area of a circle formula and solve.

- $A = \pi 2^2$
- $A = 4\pi$
- $A = (4)(3.14)$
- $A = 12.56$

Answer: The area of a circle with a diameter of 4 meters is 12.56 meters squared.

#3 Find the Area of a Circle Given the Circumference

Problem: A circle has a circumference (perimeter) of 100 meters. What is the circle's area?

Solution: When figuring out the area of a circle you need to find the radius to plug into the area formula. In this example we only know the circumference. Let's plug in the known circumference (100) into the circumference of a circle formula and solve for r:

- $100 = 2\pi r$
- $100 = (2)(3.14)r$
- $100 = 6.28r$
- $r = 15.92$ (*divide both sides by 6.28*)

Now, that we know the radius equals 15.92, let's plug r into the area of a circle formula and solve:

- $A = \pi(15.92)^2$
- $A = 253.45\pi$

- A = (253.45)(3.14)

- A = 795.83

Answer: The area of a circle with a circumference of 100 meters is about 796 square meters.

Do you need more geometry help online?

If you have other types of problems you need help with related to the **area of a circle** please ask in the comment section below. I'll be glad to help out and may even include your area of a circle problem in the problem/solution section above.