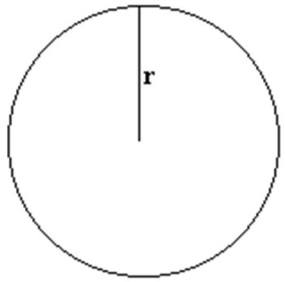
Area of a Circle

Circle Area Conjecture - The area of a circle is given by the formula $A = \pi r^2$ where A is the area and r is the radius of the circle.



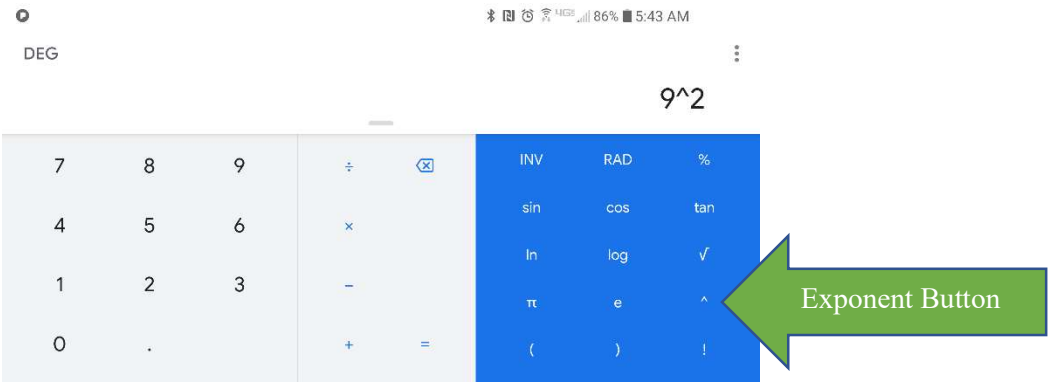
**When working with area, we must ALWAYS work from radius.

Example 1: Find exact area of a circle given radius

If $r = 9$ cm, $A =$_____

$A = \pi r^2$

$A = \pi(9)^2$ **To square a number, you can either multiply it by itself or use the exponent button on your calculator.



$A = \pi(81)$

$\boldsymbol{A = 81\pi}$ **cm²** **Because this problem gave us an "equal sign", we leave our answer in terms of π.

Example 2: Find exact area of a circle given diameter

If $d = 6.4$ cm, $A =$_____

We are given diameter, but we need radius. Remember that radius is half of the diameter.

$r = \frac{6.4}{2} = 3.2$

$A = \pi r^2$

$A = \pi(3.2)^2$

$A = \pi(10.24)$

$\boldsymbol{A = 10.24\pi \text{ cm}^2}$ **Because this problem gave us an "equal sign", we leave our answer in terms of π.

Example 3: Find radius and diameter given exact area

If $A = 529\pi$ cm^2, $r =$_____, $d =$_____

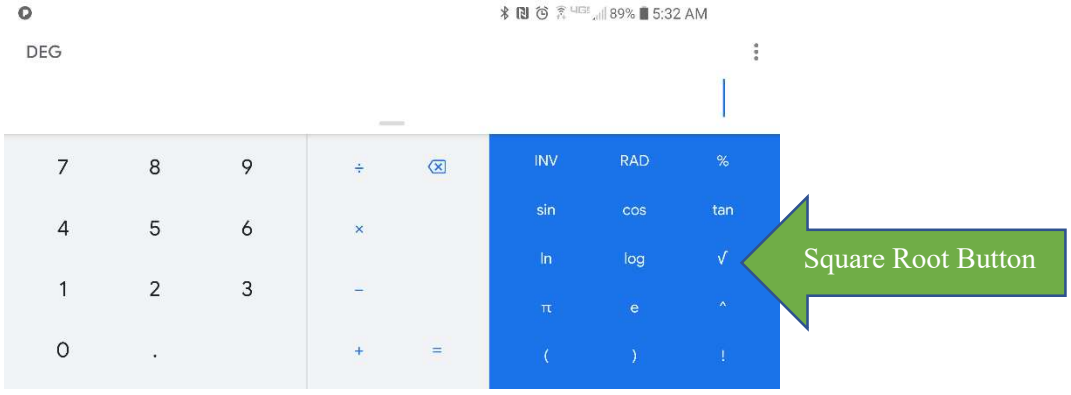
This problem will have two answers.

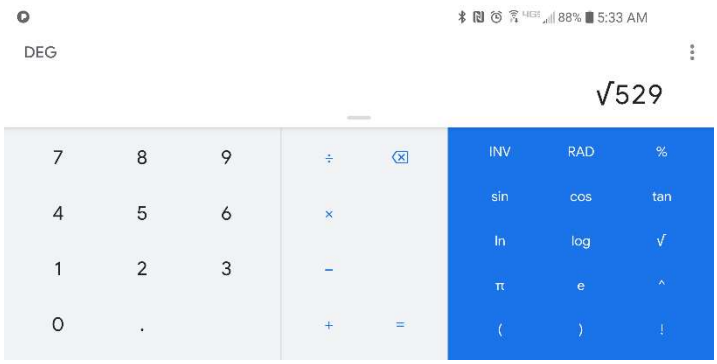
$A = \pi r^2$

$529\pi = \pi r^2$ **Since there is a π on both sides of the equation, we can divide it out.

$\frac{529\pi}{\pi} = \frac{\pi r^2}{\pi}$

$529 = r^2$ **To undo a square, we must square root.





$\sqrt{529} = \sqrt{r^2}$

$23 = r$

$\boldsymbol{r = 23}$ **cm**

**Remember that radius is a length, so the power on the units is 1.

$d = 23 \cdot 2 = 46$

$\boldsymbol{d = 46}$ **cm**