

### Area of Shaded Regions

#### RECALL:

- a. The square shown has a side of 8 in.  
We know the formula for the area of a square:  
 $A = s^2$ , where s is the side of the square. So,  
the area of the square shown is .....

$$A = s^2$$

$$A = (8)^2$$

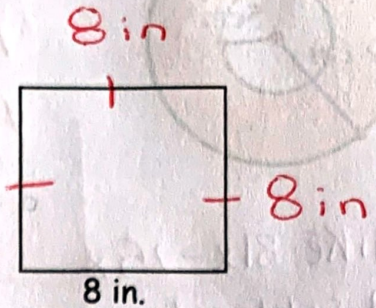
$$A = 64 \text{ in}^2$$

or

$$A = bh$$

$$A = (8 \times 8)$$

$$A = 64 \text{ in}^2$$

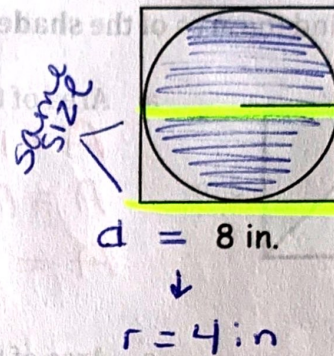


- b. The circle shown has a radius of 4 in.  
We know the formula for the area of a circle:  
 $A = \pi r^2$ , substitute 3.14 for  $\pi$ . So, the area of  
the circle shown is .....

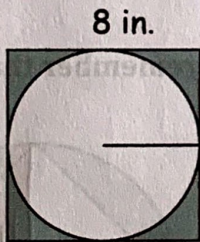
$$A = \pi r^2$$

$$A = (3.14 \times 4)^2$$

$$A = 50.24 \text{ in}^2$$



**THINK:** If the circle above is *inscribed* in the square above, can you think of how we could calculate just the shaded region of the figure below?



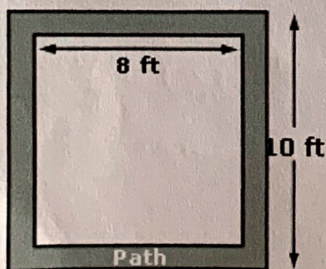
$$A \text{ of } \square - A \text{ of } \bigcirc$$

$$64 - 50.24$$

$$13.76 \text{ in}^2$$

**Shaded** → **Subtract**

**Example #1:** A square garden measuring 8 feet on a side is surrounded by a 1-foot-wide path. What is the area of the path? Round to the nearest whole number.



- a. Area of the large square:

$$A = s^2$$

$$A = (10)^2$$

$$A = 100 \text{ ft}^2$$

- b. Area of the small square:

$$A = s^2$$

$$A = (8)^2$$

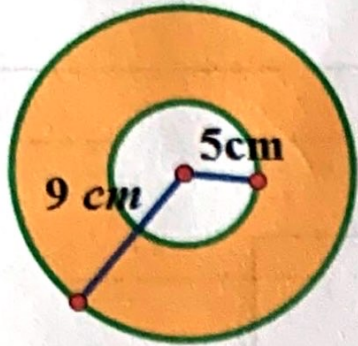
$$A = 64 \text{ ft}^2$$

- c. Area of the shaded region:

$$100 - 64$$

$$36 \text{ ft}^2$$

**Example #2:** Two concentric circles have radii of 5 and 9 inches respectively. Find the area of the shaded region between the circles as shown in the diagram. Leave in terms of pi.



a. Area of the large circle:  $r = 9$

$$A = \pi r^2$$

$$A = \pi (9)^2$$

$$A = 81\pi \text{ cm}^2$$

b. Area of the small circle:  $r = 5$

$$A = \pi r^2$$

$$A = \pi (5)^2$$

$$A = 25\pi \text{ cm}^2$$

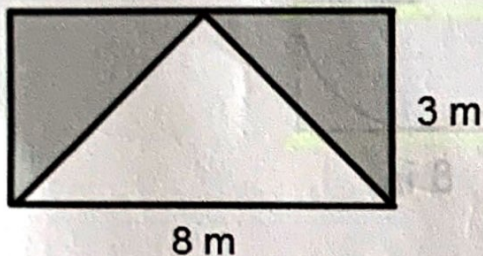
c. Area of the shaded region:

$$81\pi - 25\pi$$

$$56\pi \text{ cm}^2$$

\* like  $81x - 25x$   
just subtract  
coefficients \*

**Example #3:** Find the area of the shaded region.



a. Area of the rectangle:

$$A = lw$$

$$A = (8)(3)$$

$$A = 24 \text{ m}^2$$

b. Area of the triangle:

$$A = \frac{1}{2}bh$$

$$A = \frac{1}{2}(8)(3)$$

$$A = 12 \text{ m}^2$$

c. Area of the shaded region:

$$24 - 12$$

$$12 \text{ m}^2$$

**You Try:**