

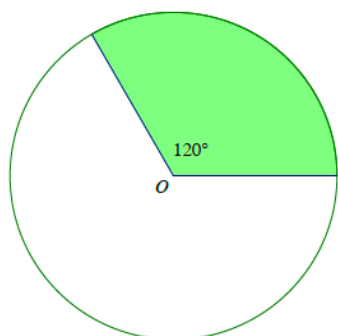
### Lesson Summary

To calculate composite figures with circular regions:

- Identify relevant geometric areas (such as rectangles or squares) that are part of a figure with a circular region.
- Determine which areas should be subtracted or added based on their positions in the diagram.
- Answer the question, noting if the exact or approximate area is to be found.

### Problem Set

1. A circle with center  $O$  has an area of  $96 \text{ in}^2$ . Find the area of the shaded region.



**Peyton's Solution**

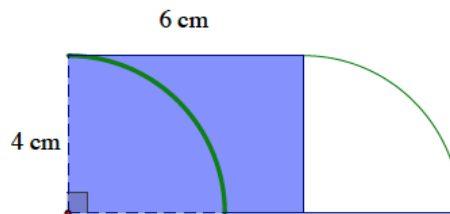
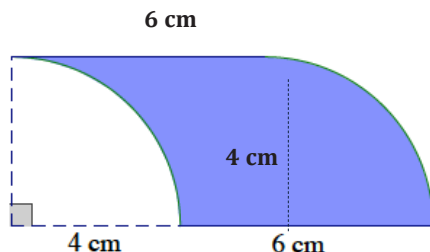
$$A = \frac{1}{3}(96 \text{ in}^2) = 32 \text{ in}^2$$

**Monte's Solution**

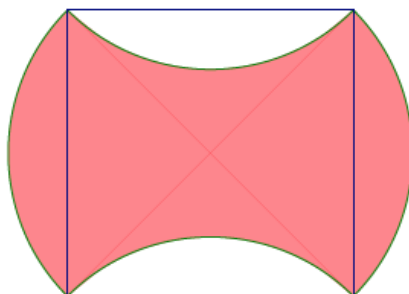
$$A = \frac{96}{120} \text{ in}^2 = 0.8 \text{ in}^2$$

Which person solved the problem correctly? Explain your reasoning.

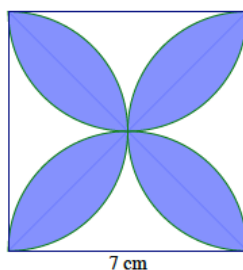
2. The following region is bounded by the arcs of two quarter circles, each with a radius of 4 cm, and by line segments 6 cm in length. The region on the right shows a rectangle with dimensions 4 cm by 6 cm. Show that both shaded regions have equal areas.



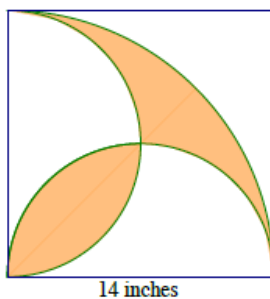
3. A square is inscribed in a paper disc (i.e., a circular piece of paper) with a radius of 8 cm. The paper disc is red on the front and white on the back. Two edges of the circle are folded over. Write and explain a numerical expression that represents the area of the figure. Then, find the area of the figure.



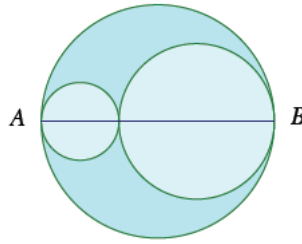
4. The diameters of four half circles are sides of a square with a side length of 7 cm.



- Find the exact area of the shaded region.
  - Find the approximate area using  $\pi \approx \frac{22}{7}$ .
  - Find the area using the  $\pi$  button on your calculator and rounding to the nearest thousandth.
5. A square with a side length of 14 inches is shown below, along with a quarter circle (with a side of the square as its radius) and two half circles (with diameters that are sides of the square). Write and explain a numerical expression that represents the area of the figure.



6. Three circles have centers on segment  $AB$ . The diameters of the circles are in the ratio 3:2:1. If the area of the largest circle is  $36 \text{ ft}^2$ , find the area inside the largest circle but outside the smaller two circles.



7. A square with a side length of 4 ft. is shown, along with a diagonal, a quarter circle (with a side of the square as its radius), and a half circle (with a side of the square as its diameter). Find the exact, combined area of regions I and II.

