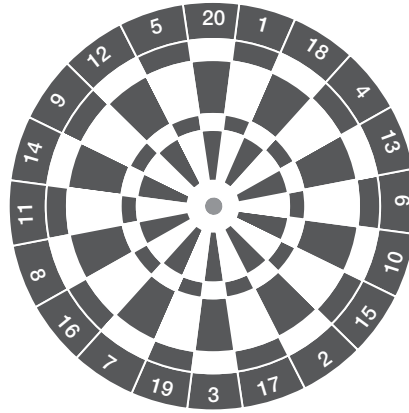


PROBLEM 1 Hitting the Bull's-Eye of a Circle



A standard dartboard is shown. Each section of the board is surrounded by wire, and the numbers indicate scoring for the game. For a single throw, the highest possible score can be achieved by landing a dart at the very center or the bull's-eye, of the dartboard.

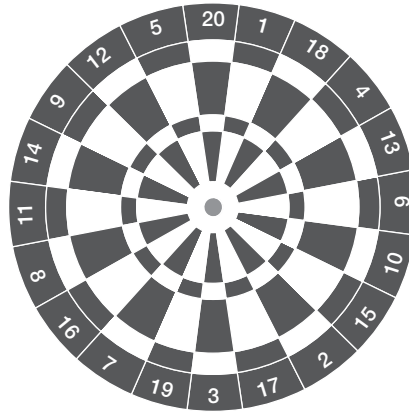


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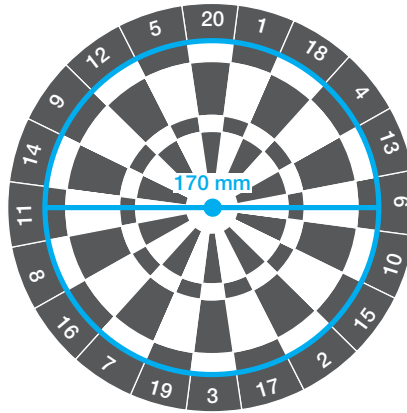
Concentric circles are circles that share the same center point.



1. How many concentric circles do you see in the dartboard shown, not including the dartboard itself? Draw these circles.



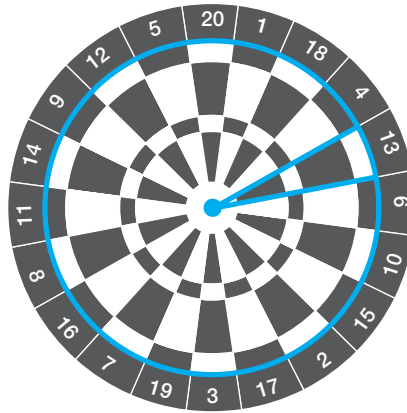
2. The diameter of the outermost circle is 170 millimeters. Calculate its area. Express your answer in terms of π .



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A **sector of a circle** is a region of the circle bounded by two radii and the included arc.

3. The dartboard can be divided into congruent sectors.



Each sector looks like a piece of pizza.



- Determine the number of sectors contained in the outermost circle.
- Determine the measure of the central angle and the measure of the intercepted arc formed by each sector.
- Determine the ratio of the length of each intercepted arc to the circumference.

d. Determine the ratio of the area of each section to the area of the circle.



e. Determine the area contained by each of these sectors of the circle. Express your answer in terms of π . Explain how you determined the area.

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The formula for determining the area of a sector can be written as follows:

$$A = \text{area of circle} \cdot \frac{\text{measure of angle}}{360^\circ}$$

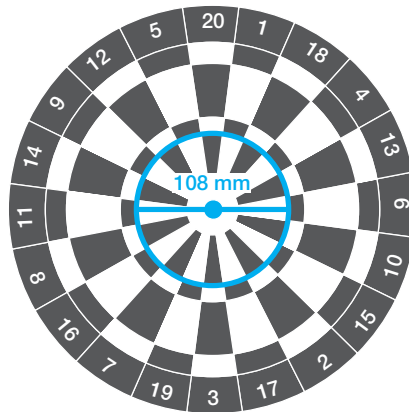
$$= \pi \cdot r^2 \cdot \frac{\text{measure of angle}}{360^\circ}$$

$$= \frac{\text{measure of angle}}{360^\circ} \cdot \pi r^2$$

4. How does the formula for determining the area of a sector compare to the formula for determining the arc length.



The innermost circle of the dartboard has a diameter of 108 millimeters and is divided into 20 congruent sectors as shown.



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5. Darcy and Mike notice that half of the sectors of the innermost circle on the dartboard are the same color. Mike says that to calculate the total area of all the sectors of the same color, he could calculate the area of half the circle. Darcy says to, instead, calculate the area of one sector and multiply that area by 10. Who's correct? Explain your reasoning.

