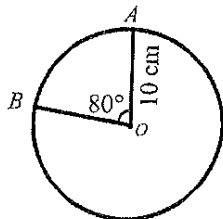


10.4 Area of Sectors

A sector of a circle is a region bounded by a central angle and its intercepted arc. In the circle below $\angle AOB$ is a central angle measuring 80° . Therefore, \widehat{AB} is 80° . $\angle AOB$ and \widehat{AB} form a sector of the circle.

Example 5: Find the area of the sector formed by $\angle AOB$ and \widehat{AB} .



Step 1: The area of a sector is a fraction of the area of the circle. First, we must find the approximate area of the circle.

$$A = \pi r^2$$

$$A \approx 3.14 \times 10^2 \approx 3.14 \times 100 \approx 314 \text{ cm}^2$$

Step 2: Now we need to find the fraction of the circle that the sector occupies. Remember that the sum of the measures of the central angles of a circle is 360. The fraction that the sector occupies is the measure of the central angle, denoted by the letter N , divided by 360.

$$\text{Fraction that sector occupies} = \frac{N}{360} = \frac{80}{360} = \frac{2}{9}$$

Step 3: Now we can calculate the approximate area of the sector.

$$A = \frac{N}{360} \pi r^2 \approx \frac{2}{9} \times 3.14 \text{ cm}^2 \times 10^2 \approx \frac{628}{9} \text{ cm}^2$$

$$\text{Simplified, } A \approx 69\frac{7}{9} \text{ cm}^2$$

Each of the following is a measurement for a central angle. Calculate the fraction of a circle that the central angle occupies. Simplify your answers.

- | | | | | | |
|---------------|---------------|---------------|----------------|-----------------|----------------|
| 1. 30° | 3. 16° | 5. 45° | 7. 120° | 9. 15° | 11. 60° |
| 2. 2° | 4. 52° | 6. 72° | 8. 270° | 10. 108° | 12. 90° |

Find the area of the sector bounded by $\angle XYZ$ and \widehat{XZ} in each of the following circles. Use $\pi \approx 3.14$.

