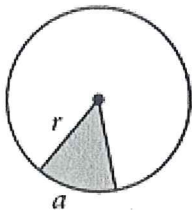# Area of Sectors Notes

Key

Find the area of the shaded region.

Sectors: fraction of area of full circle
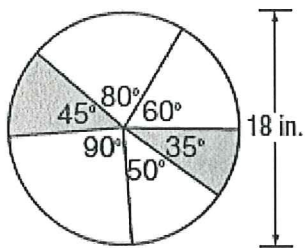

$$\frac{a}{360} \cdot \bigcirc = \triangle$$

$$\frac{a}{360} \cdot \pi r^2 = A_{sector}$$

$$\frac{\theta}{360} \cdot A = A_s$$

Example 1:

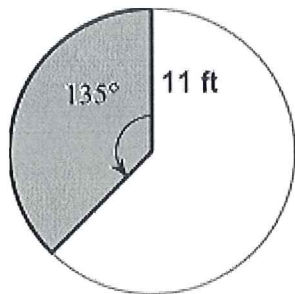135°   11 ft

$$A_s = \frac{135}{360} \pi 11^2$$

$$A_s = \frac{16335\pi}{360}$$

$$A_s = \frac{363\pi}{8} \, ft^2$$

Example 2:

45° 80° 60°
90° 35°
50°
18 in.

$$\frac{45+35}{360} \pi \cdot 9^2$$

$$A_s = \frac{6480\pi}{360}$$

$$A_s = 18\pi \, in^2$$

Example 3:

14 cm

270°

$$A_s = \frac{270\pi 14^2}{360}$$
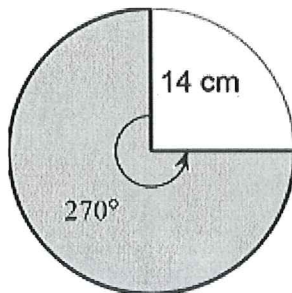
$$A_s = \frac{52920\pi}{360}$$

$$A_s = 147\pi \, cm^2$$

Example 4: The length of arc *XY* of a circle is equal to $\frac{1}{6}$ of the circumference of the circle. The length of the arc is 7π inches. Find the central angle of the circle, in degrees. Find the radius, in inches, and then use that radius to find the area of the shaded sector, in square inches. If needed, round any answer to the nearest tenth.

$$\angle XPY = \tfrac{1}{6}(360°) = 60°$$

$$7\pi \times 6 = C$$
$$42\pi = C$$
$$\therefore r = 21\text{in}$$
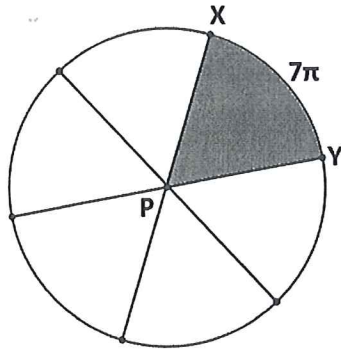
$$A_s = \tfrac{1}{6}A$$
$$A_s = \tfrac{60}{360}(21^2\pi)$$
$$A_s = \tfrac{1}{6}(441\pi)$$
$$A_s = \tfrac{441\pi}{6}$$
$$A_s = \tfrac{147\pi}{2} \quad \Big) \text{ simplify}$$
$$A_s = 73.5\pi \qquad \text{fractions.}$$

Central Angle $\angle XPY = $ __60°__

Radius = __21in__
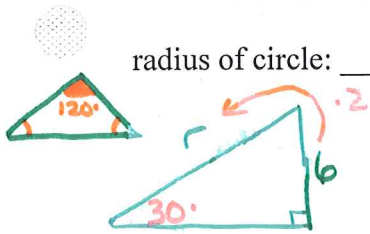
Sector Area = $\frac{147\pi}{2}$ in²

rounded ≈ 230.9 in²

Example 5.

The area of the regular polygon ABC is 187.06 cm². Round to the nearest tenth.
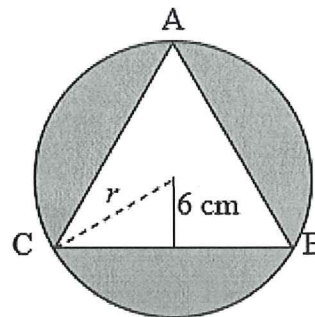
A. Find the radius of the circle, *r*.

radius of circle: ___12 cm___

$$r = 6 \cdot 2 = 12 \text{ cm}$$
$$\text{or } \sin 30 = \frac{6}{r}$$
$$r = 12$$

B. Find the area of the shaded region.

A = ___265.3 cm²___

Shaded = full circle − regular polygon

$$\text{Shaded} = 12^2\pi - 187.06$$
$$A = 144\pi - 187.06$$
$$A = 452.39 - 187.06$$
$$A = 265.33 \text{ cm}^2$$