

Precalculus, Section 6.1, #82 & 84  
Angles and Their Measure

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$A$  denotes the area of the sector of a circle of radius  $r$  formed by the central angle  $\theta$ . Find the missing quantity. Round answers to three decimal places.<sup>1</sup>

82.  $\theta = \frac{1}{4}$  radian,  $A = 6$  square centimeters,  $r = ?$

The area  $A$  of the sector of a circle of radius  $r$  formed by a central angle of  $\theta$  radians is given by

$$A = \frac{1}{2}r^2\theta$$

Note that this equation relates all of the known quantities  $A$  and  $\theta$  and the unknown quantity,  $r$ . Substitute and solve

$$A = \frac{1}{2}r^2\theta$$

$$6 = \frac{1}{2} \cdot r^2 \cdot \frac{1}{4}$$

$$6 = \frac{1}{8} \cdot r^2$$

$$8 \cdot 6 = 8 \cdot \frac{1}{8} \cdot r^2$$

$$48 = r^2$$

So

$$\sqrt{48} = r \quad \text{or} \quad -\sqrt{48} = r$$

since  $r$  is the radius of a circle,  $r$  is nonnegative, and thus

$$4\sqrt{3} = r$$

$$6.928 \text{ centimeters} \approx r$$

84.  $r = 6$  meters,  $A = 8$  square meters,  $\theta = ?$

Substitute and solve

$$A = \frac{1}{2}r^2\theta$$

$$8 = \frac{1}{2} \cdot 6^2 \cdot \theta$$

$$8 = 18 \cdot \theta$$

$$\frac{8}{18} = \theta$$

$$\frac{4}{9} = \theta$$

$$0.444 \text{ radians} \approx \theta$$

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<sup>1</sup>Sullivan, *Precalculus: Enhanced with Graphing Utilities*, p. 365, #82, #84.