### 12.65 - Areas of Parts of a Circle

Find the shaded area. The radius of each circle is $r$. If two circles are shown, $r$ is the radius of the smaller circle and $R$ is the radius of the larger one. All given measurements are in centimeters.
1)

2)

3)

4) $r=2$

5) $r=8$

6) $\quad R=7$
$r=4$

8) $\quad \begin{aligned} & R=12 \\ & r=9\end{aligned}$


For the following, find the measurement of the radius.
9)

> The shaded area is $12 \pi \mathrm{~cm}^{2}$.
10) The area of the
annulus is $32 \pi \mathrm{~cm}^{2}$.


Find the $m \angle A B C$.
11) The shaded area is $120 \pi \mathrm{~cm}^{2}$.
$r=24 \mathrm{~cm}$


