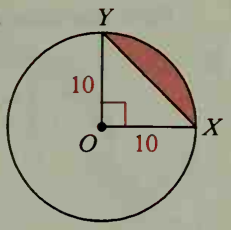
Example 2 Find the area of the shaded region bounded by $\overline{XY}$ and $\overset{\frown}{XY}$.



Solution

$$\text{Area of sector } XOY = \frac{90}{360} \cdot \pi \cdot 10^2 = 25\pi$$

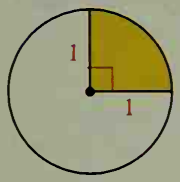
$$\text{Area of } \triangle XOY = \frac{1}{2} \cdot 10 \cdot 10 = 50$$

$$\text{Area of shaded region} = 25\pi - 50$$

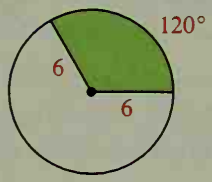
Classroom Exercises

Find the arc length and area of each shaded sector.

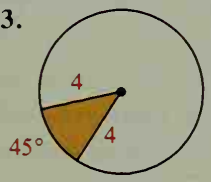
1.



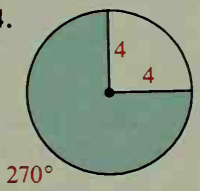
2.



3.



4.



5. In a circle with radius 6, $m\overset{\frown}{AB} = 60$. Make a sketch and find the area of the region bounded by $\overline{AB}$ and $\overset{\frown}{AB}$.

6. A circle has area 160π cm^2. If a sector of the circle has area 40π cm^2, find the measure of the arc of the sector.

7. Compare the areas of two sectors if

a. they have the same central angle, but the radius of one is twice as long as the radius of the other.

b. they have the same radius, but the central angle of one is twice as large as the central angle of the other.

Written Exercises

Sector AOB is described by giving $m\angle AOB$ and the radius of circle O. Make a sketch and find the length of $\overset{\frown}{AB}$ and the area of sector AOB.

A

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.
$m\angle AOB$	30	45	120	240	180	270	40	320	108	192
radius	12	4	3	3	1.5	0.8	$\frac{9}{2}$	$1\frac{1}{5}$	$5\sqrt{2}$	$3\sqrt{3}$

11. The area of sector AOB is 10π and $m\angle AOB = 100$. Find the radius of circle O.

12. The area of sector AOB is $\frac{7\pi}{2}$ and $m\angle AOB = 315$. Find the radius of circle O.