WARMUP

Page 447 CE #1-7 odd

$2\pi R$

πR^2

Complete the table. Leave answers in terms of π.

	1.	2.	3.	4.	5.	6.	7.	8.
Radius	3	4	0.8	5π	9	6	7	12
Circumference	6π	8π	1.6π	10π	18π	12π	14π	24π
Area	9π	16π	$.64\pi$	25π	81π	36π	49π	144π

Find the circumference and area to the nearest tenth. Use $\pi \approx 3.14$.

9. $r = 2$ **10.** $r = 6$ **11.** $r = \frac{3}{2}$ **12.** $r = 1.2$

SECTION 11.6:
ARC LENGTHS AND AREAS OF SECTORS

30/360 1/12

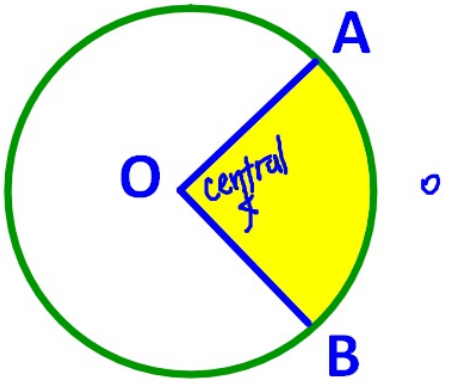
Standards:

SECTOR OF A CIRCLE

A sector of a circle is a region bounded by 2 radii and an arc of the circle.

Example: Shaded region is sector AOB

Area



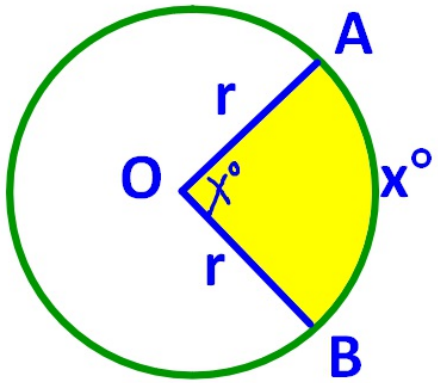
ARC LENGTH & AREAS OF SECTORS

If m $(\overset{\frown}{AB})$ = x, then: length of $\overset{\frown}{AB} = \frac{x}{360} \cdot 2\pi r$

(part of circle)(circum)

Area of sector AOB: $= \frac{x}{360} \cdot \pi r^2$

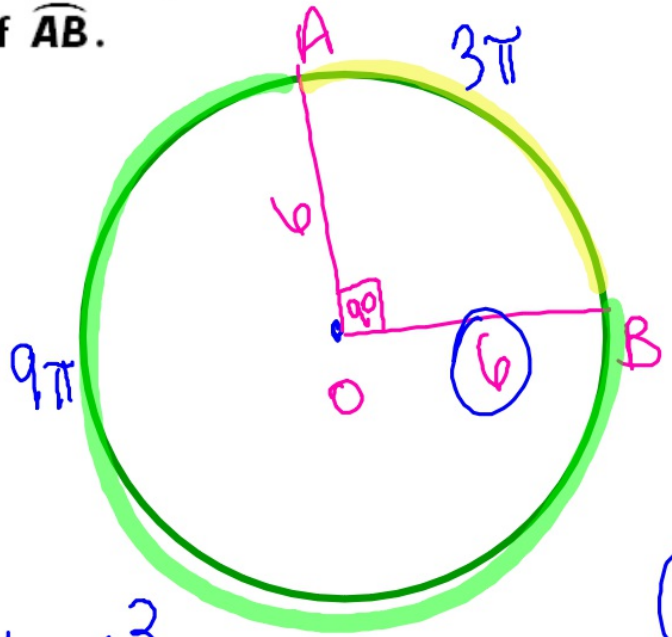
(part of circle)(area)



Sector *AOB* is described by giving $m(\angle AOB)$ and the radius of circle *O*.

Make a sketch and find the length of $\overset{\frown}{AB}$.

	I)
$m(\angle AOB)$	90
radius	6



$\frac{90}{360} = \frac{1}{4}$

$C = 2\pi R$

$6 \cdot 2\pi$

12π

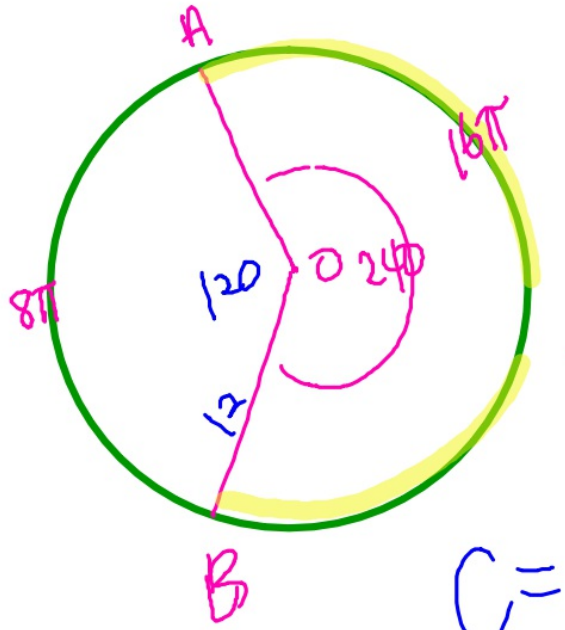
☆ 3π

$\frac{1}{4}(12\pi)$ 3

Sector *AOB* is described by giving $m(\angle AOB)$ and the radius of circle *O*.

Make a sketch and find the length of $\overset{\frown}{AB}$.

	2)
$m(\angle AOB)$	240
radius	12



$\frac{240}{360} = \frac{2}{3}$

$\frac{2}{3}(24\pi)$

$C = 2\cdot 12\pi$

24π

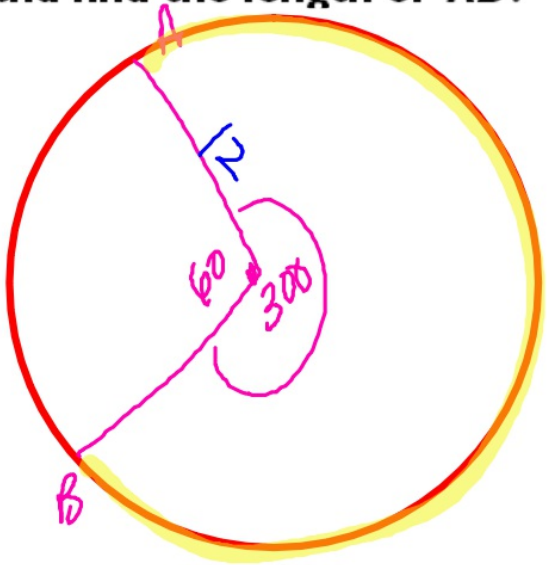
☆ 16π

3π

Sector *AOB* is described by giving $m(\angle AOB)$ and the radius of circle *O*.

Make a sketch and find the length of $\overset{\frown}{AB}$.

$m(\angle AOB)$
radius



3)
300
12

$\frac{300}{360} = \frac{5}{6}$

$12 \cdot 2\pi = 24\pi$

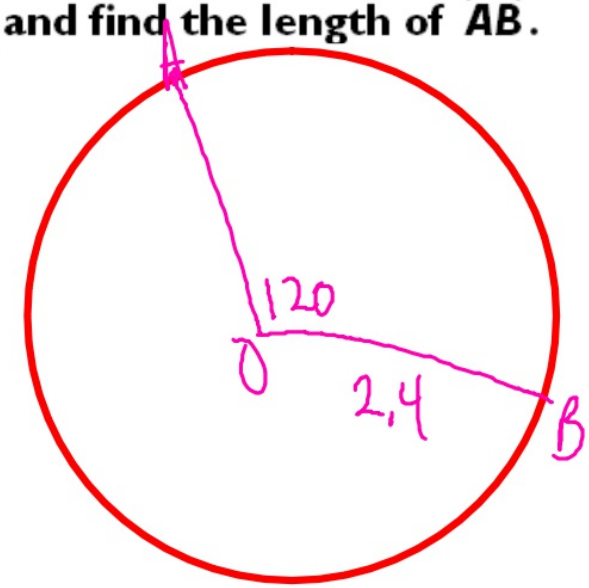
$\frac{5}{10}(24\pi)$

☆ **20π**

Sector *AOB* is described by giving $m(\angle AOB)$ and the radius of circle *O*.

Make a sketch and find the length of $\overset{\frown}{AB}$.

	4)
$m(\angle AOB)$	120
radius	2.4



$\frac{120}{360} = \boxed{\frac{1}{3}}$

☆ **1.6π**

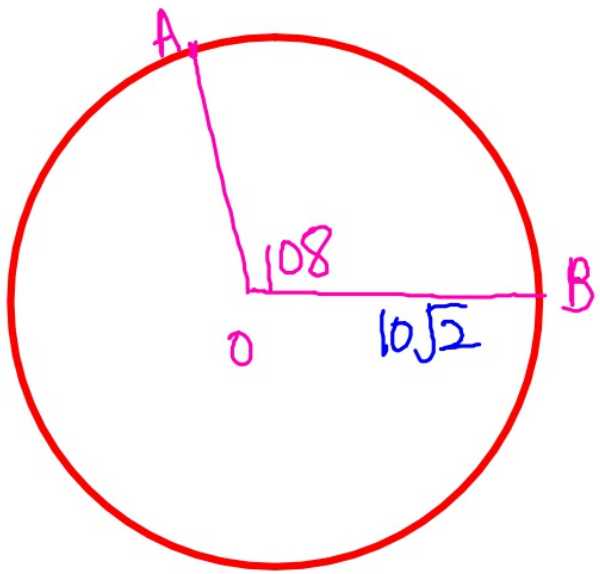
$\frac{1}{3}(4.8\pi)$ (1.6)

$C = 2(2.4)\pi = \boxed{4.8\pi}$

Sector *AOB* is described by giving $m(\angle AOB)$ and the radius of circle *O*.

Make a sketch and find the length of $\overset{\frown}{AB}$.

$m(\angle AOB)$
radius



5)
108
$10\sqrt{2}$

$\frac{108}{360} = \frac{9}{30} = \boxed{\frac{3}{10}}$

$C = \boxed{20\sqrt{2}\pi}$

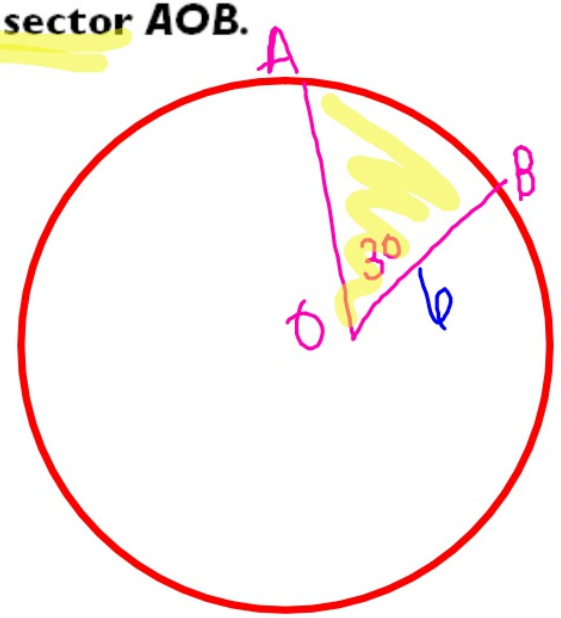
☆ $6\pi\sqrt{2}$

$6\sqrt{2}\pi$

$\frac{3}{\cancel{10}}\left(\cancel{20}^{2}\sqrt{2}\right)\pi$

Sector *AOB* is described by giving $m(\angle AOB)$ and the radius of circle *O*.
Make a sketch and find the area of sector *AOB*.

	6)
$m(\angle AOB)$	30
radius	6



$\frac{30}{360} = \boxed{\frac{1}{12}}$

$A = \pi R^2 = 6^2\pi$

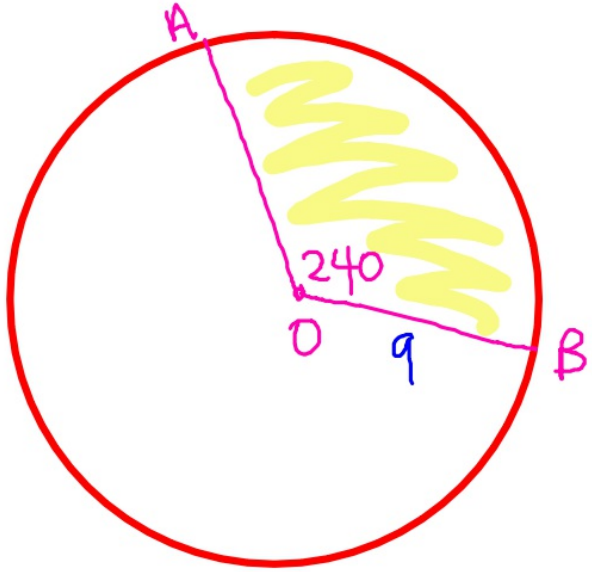
$= \boxed{36\pi}$

$\frac{1}{12}(36\pi)$

☆ 3π

Sector *AOB* is described by giving $m(\angle AOB)$ and the radius of circle *O*. Make a sketch and find the area of sector *AOB*.

	7)
$m(\angle AOB)$	240
radius	9



$\frac{240}{360} = \frac{2}{3}$

$A = 9^2\pi$

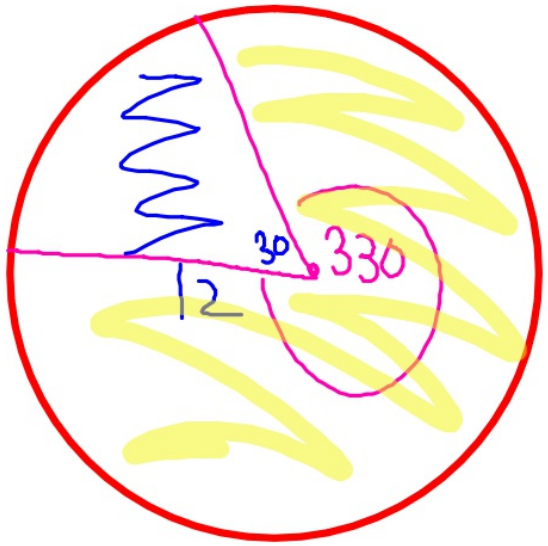
81π

$\frac{2}{3}(81\pi)$

☆ 54π

Sector *AOB* is described by giving $m(\angle AOB)$ and the radius of circle *O*. Make a sketch and find the area of sector *AOB*.

	8)
$m(\angle AOB)$	330
radius	12



$\frac{30}{360} = \frac{1}{12}$

$\frac{330}{360} = \frac{11}{12}$

☆ **132π**

$\frac{1}{12}(144\pi)$

30° 12π

$A = 144\pi$

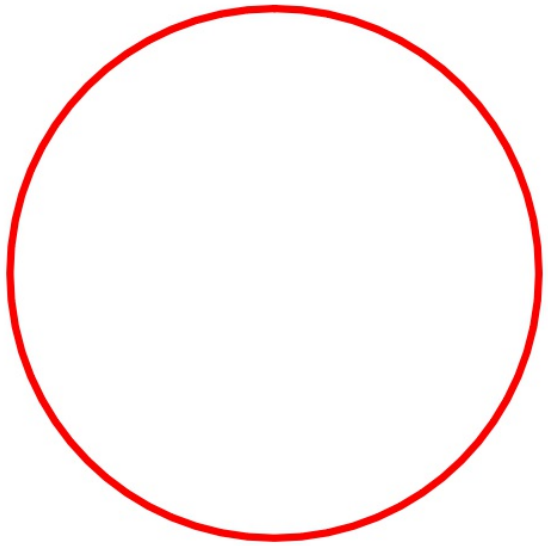
-12π

132π

$\frac{11}{\cancel{12}_{1}}\cdot\frac{\cancel{12}^{1}}{1}(144)\pi$

Sector AOB is described by giving $m(\angle AOB)$ and the radius of circle O.
Make a sketch and find the area of sector AOB.

	9)
$m(\angle AOB)$	75
radius	2.4



☆ 1.2π

Sector *AOB* is described by giving $m(\angle AOB)$ and the radius of circle *O*.
Make a sketch and find the area of sector *AOB*.

	10)
$m(\angle AOB)$	108
radius	$5\sqrt{3}$

$5 \cdot 5 \sqrt{3} \sqrt{3}$

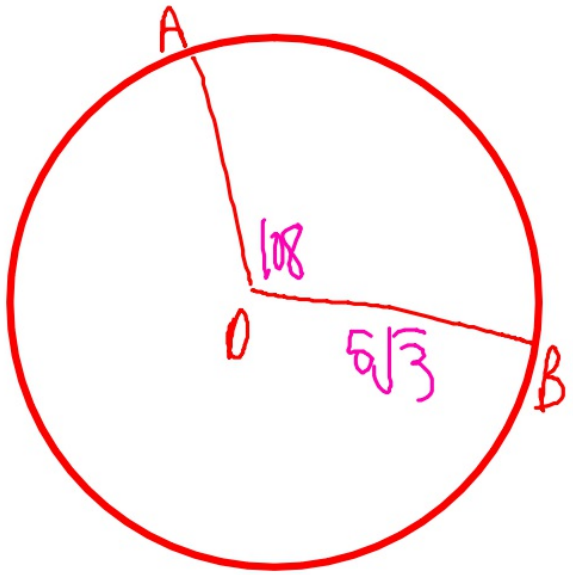
3

$\frac{3}{10}\left(75\pi\right)$

$\frac{15}{2}$

☆ **22.5π**

$\frac{45}{2}\pi$



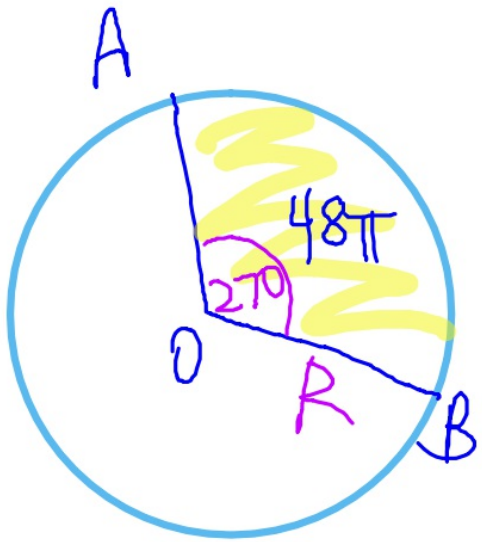
$\frac{108}{360} = \frac{3}{10}$

$A = \left(5\sqrt{3}\right)^2 \pi$

$5 \cdot 5 \cdot 3$

75π

11) The area of sector AOB is 48π and $m(\angle AOB) = 270$. Find the radius of circle O.



$48\pi = \frac{3}{4}\pi(R^2)$

$\frac{16}{4}\cdot\frac{48}{3} = \frac{4}{3}R^2$

$4 \cdot 48 = \frac{4}{3}R^2$

$64 = R^2$

$\frac{192}{3} = \frac{3}{3}R^2$

$\frac{48}{4} = \frac{4}{1}$ $\frac{48}{1} = \frac{1}{4}$

$64 = R^2$

12) The area of sector AOB is $\frac{9\pi}{4}$ and $m(\angle AOB) = 40$. Find the radius of circle O.

9/2

$\frac{9}{4}$

$\frac{40}{360}\left(\frac{9}{1}\right)\pi R^2$

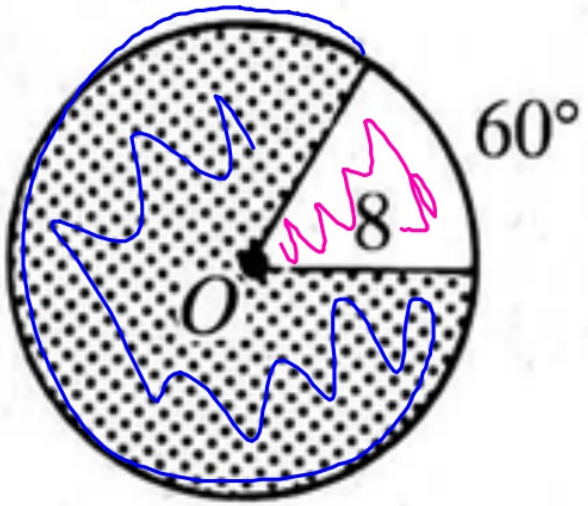
$\frac{9}{4} = \frac{40}{360}\pi R^2$

$\sqrt{\frac{81}{4}} = \sqrt{R^2}$

$\frac{9}{2}$

Find the area of the shaded region. Point O

13.



$64\pi - \frac{32}{3}\pi$

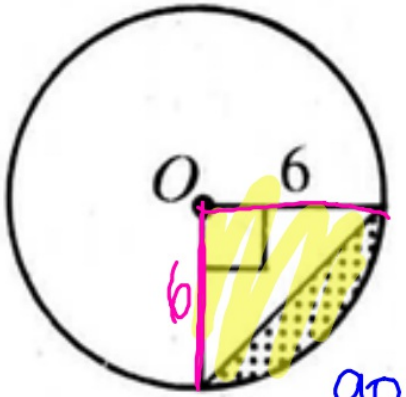
$\frac{160\pi}{3}$

$\frac{60}{360} = \frac{1}{6} \quad 64\pi$

$\frac{5 \cdot 32}{3}\pi = \frac{5}{6}(64\pi)$

3

14.



$6^2\pi$

$\frac{90}{360} = \frac{1}{4}$ 36π

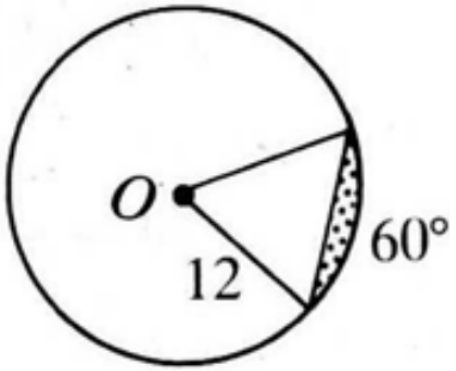
$9\pi - 18$

$\triangle \frac{1}{2}bh$

$\frac{1}{2}6 \cdot 6$

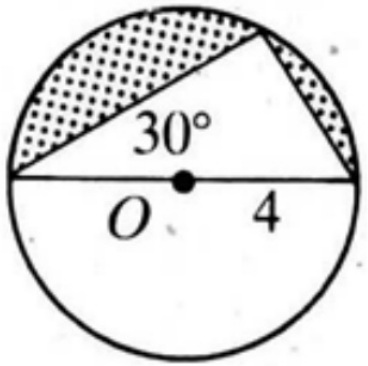
$= 18$

15.

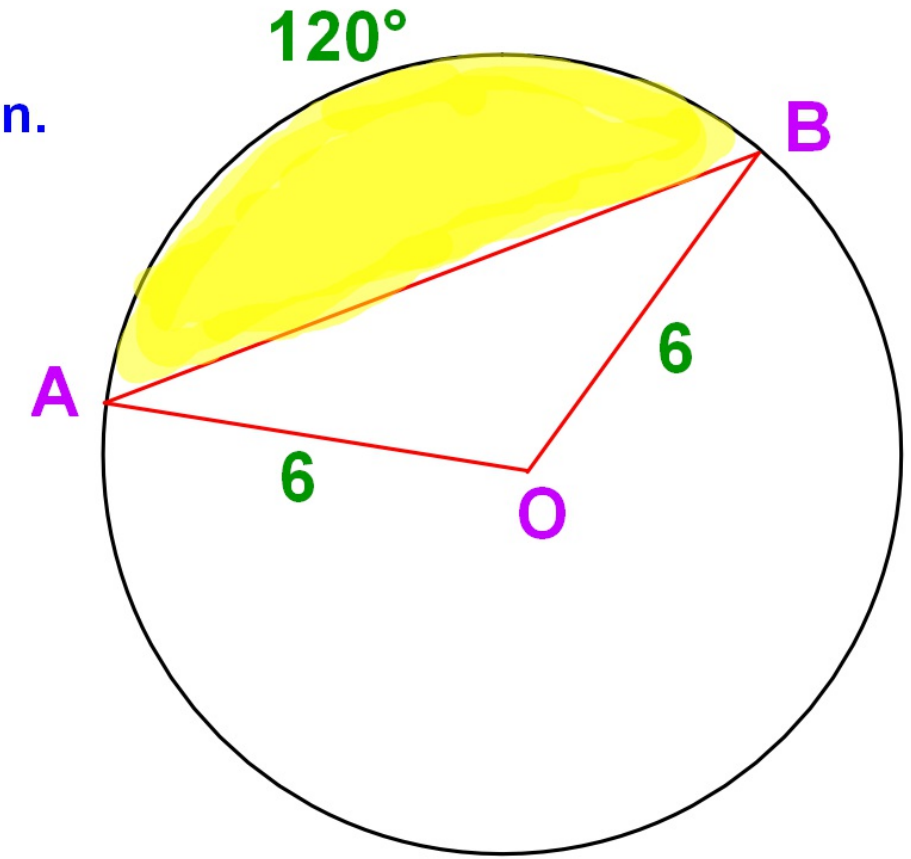


. **Point O marks the center of each circle.**

16.



Challenge: Find the area of the shaded region.



ANSWER

HOMEWORK

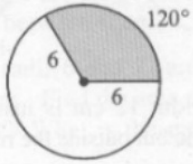
HW 11.6

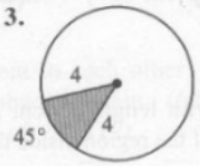
- Pg. 453 (CE): # 2, 4
- Pg. 453 (WE): #1-14,

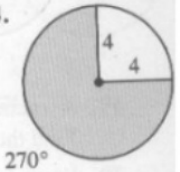
Classroom Exercises

Find the arc length and area of each shaded sector.

1. 

2. 

3. 

4. 

Written Exercises

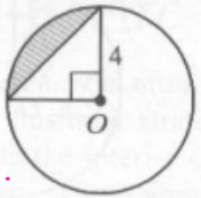
Sector AOB is described by giving $m\angle AOB$ and the radius of circle O. Make a sketch and find the length of $\overset{\frown}{AB}$ and the area of sector AOB.

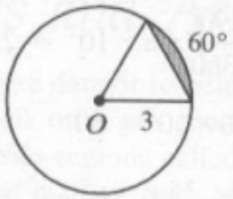
	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.
$m\angle AOB$	30	45	120	240	180	270	40	320	108	192
radius	12	4	3	3	1.5	0.8	$\frac{9}{2}$	$1\frac{1}{5}$	$5\sqrt{2}$	$3\sqrt{3}$

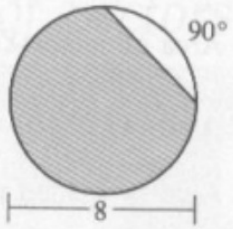
11. The area of sector AOB is 10π and $m\angle AOB = 100$. Find the radius of circle O.

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

Find the area of each shaded region. Point O marks the center of a circle.

13. 

14. 

15. 

HW 11.6
orange

- Pg. 453 (CE): # 2, 4
- Pg. 453 (WE): #1-14,