# Written Exercises

A

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

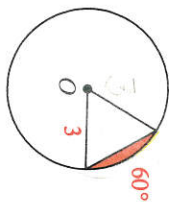|	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.
$m\angle AOB$	90	60	30	45	120	240	180	270	40	320	108	200
radius	10	12	12	4	3	3	5	8	6	6	25	3

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

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

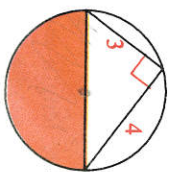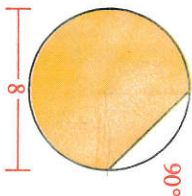**Find the area of each shaded region. Point O marks the center of a circle.**
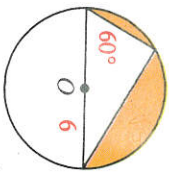
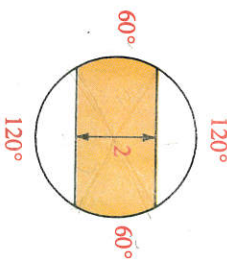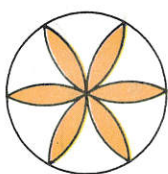**B**

15.
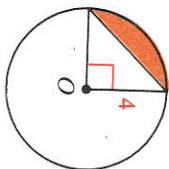
16.

17.

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20.

21. A rectangle with length 16 cm and width 12 cm is inscribed in a circle. Find the area of the region inside the circle but outside the rectangle.

22. From point P, $\overline{PA}$ and $\overline{PB}$ are drawn tangent to circle O at points A and B. If the radius of the circle is 6 and $m\angle APB = 60$, find the area of the region outside the circle but inside quadrilateral $AOBP$.

23. $\overline{AB}$ is a chord of a circle with radius 10. If $m\overparen{AB} = 72$, find the area of the region bounded by $\overline{AB}$ and $\overparen{AB}$, correct to the nearest tenth. (Use trigonometry.)

24. $ABCD$ is a square with sides 8 cm long. Two circles each with radius 8 cm are drawn, one with center A and the other with center C. Find the area of the region inside both circles.

25. **a.** Draw a square, then construct the figure shown at the right.
   **b.** If the radius of the square is 2, find the area of the shaded region.
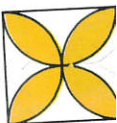
C

26. **a.** Using only a compass, construct the six-pointed figure shown at the right.
    b. If the radius of the circle is 6, find the area of the shaded region.

27. Three circles with radii 6 are tangent to each other. Find the area of the region enclosed between them.

★28. Circles X and Y, with radii 6 and 2, are tangent to each other. $\overline{AB}$ is a common external tangent. Find the area of the shaded region. (Hint: What kind of figure is $AXYB$? What is the measure of $\angle AXY$?)
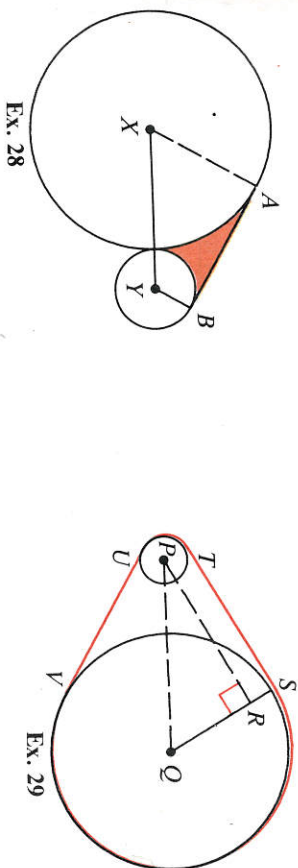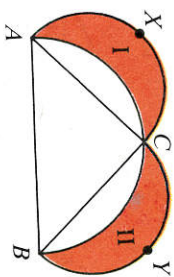

Ex. 28
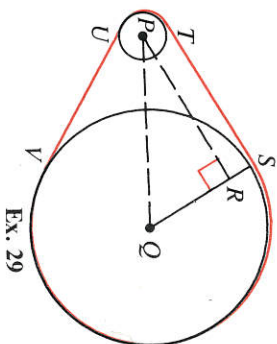
★29. The diagram at the right above shows a belt tightly stretched over two wheels with radii 5 cm and 25 cm. The distance between the centers of the wheels is 40 cm. Find the length of the belt.

Ex. 29

★30. Given: $\overparen{ACB}$, $\overparen{AXC}$, and $\overparen{CYB}$ are semicircles; $AC = CB$.
    a. Show that Area I + Area II = Area of $\triangle ABC$.
    b. Is the statement in part (a) true if $AC \neq CB$?

Challenge

Here $\overline{XY}$ has been divided into 5 congruent segments and semicircles have been drawn. But suppose $\overline{XY}$ were divided into millions of congruent segments and semicircles were drawn. What would the sum of the lengths of the arcs be?

Sarah says, "XY, because all the points would be so close to $\overline{XY}$." Mike says, "A really large number, because there would be so many arc lengths to add up." What do you say?