Geometry

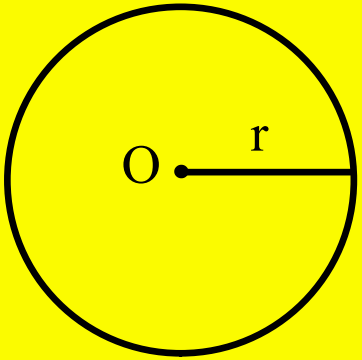
Ch. 10 Handout 10.7

Areas of Circles and Sectors

Area of a Circle

The area of a circle is the product of π and the square of the radius.

$$A = \pi r^2$$



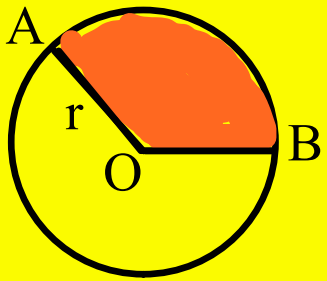
A **sector of a circle** is a region bounded by an arc of the circle and the two radii to the arc's endpoints. You name a sector using one arc endpoint, The center of the circle, and the other endpoint.

The **area of a sector** is a fractional part of the area of a circle.

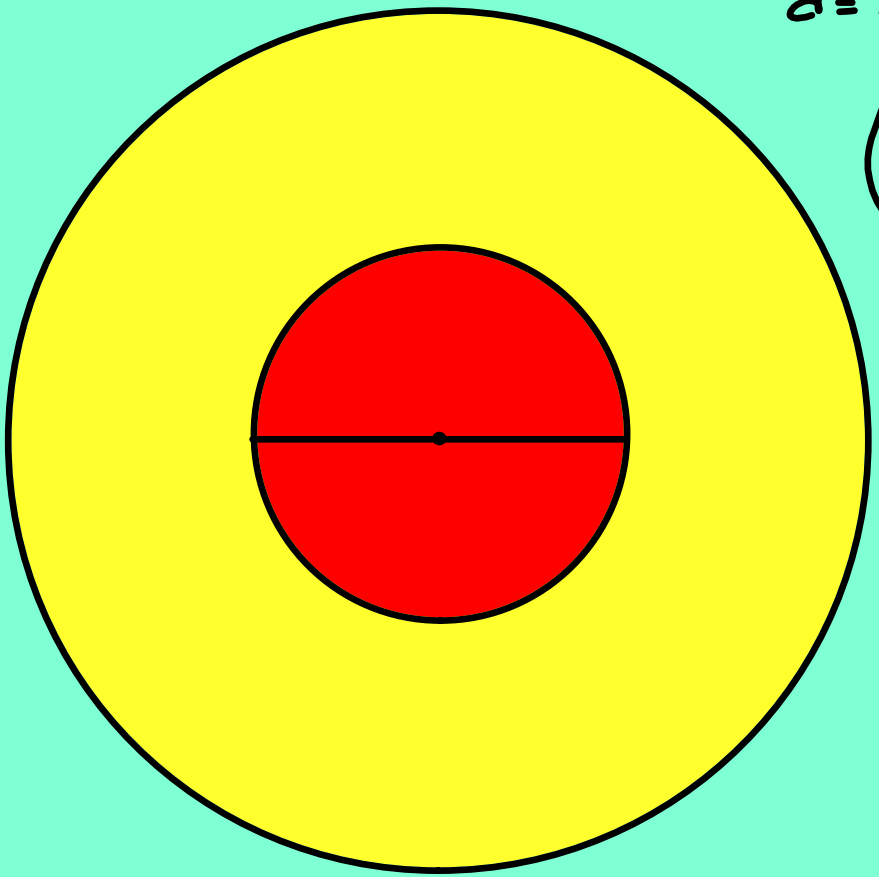
Area of a Sector of a Circle

The area of a sector of a circle is the product of the ratio $\frac{measure\ of\ the\ arc}{360}$ and the area of the circle.

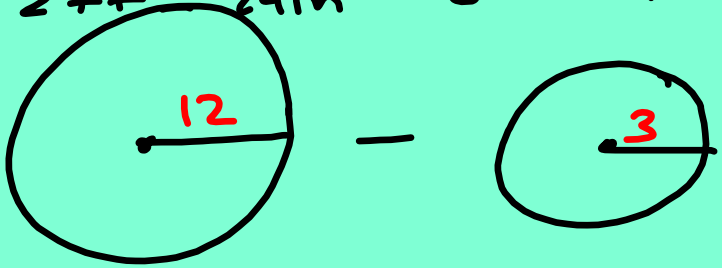
$$\text{area of sector } AOB = \frac{m\overset{\frown}{AB}}{360} \cdot \pi r^2$$



1. A circular archery target has a 2-ft diameter. It is yellow except for a red bull's-eye at the center with a 6-in diameter. Find the area of the yellow region to the nearest whole number.



$d = 2\text{ ft} = 24\text{ in}$ $d = 6\text{ in}$



$\pi r^2 - \pi r^2$

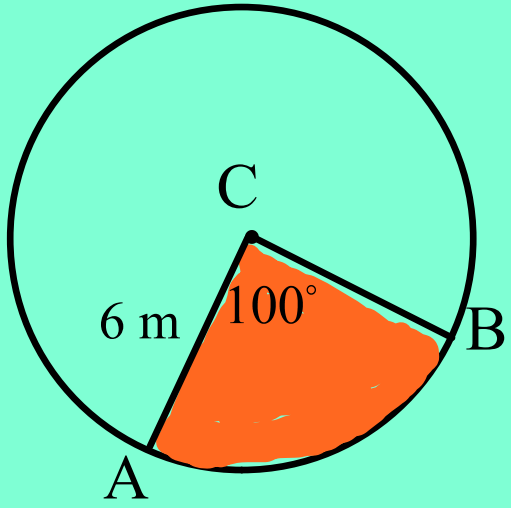
$\pi(12)^2 - \pi(3)^2$

$144\pi - 9\pi$

$A = 135\pi\text{ in}^2$

$A \approx 424\text{ in}^2$

2. Find the area of sector ACB. Leave your answer in terms of π.



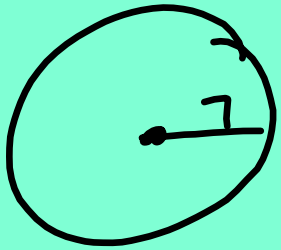
$$A = \frac{CA}{360}\pi r^2$$

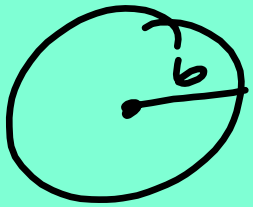
$$A = \frac{100}{360}\pi (6)^2$$

$$A = \frac{10}{36}\pi (36)$$

$$A = 10\pi \text{ m}^2$$

3. How much more pizza is in a 14-in diameter pizza than in a 12-in pizza?



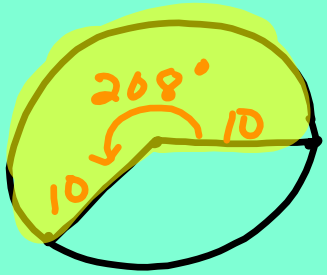


$\pi(7)^2$ $\pi(6)^2$

$49\pi - 36\pi = 13\pi \text{ in}^2$

$\approx 40.84 \text{ in}^2$

4. A circle has a diameter of 20 cm. What is the area of a sector by a 208° major arc? Round your answer to the nearest tenth.



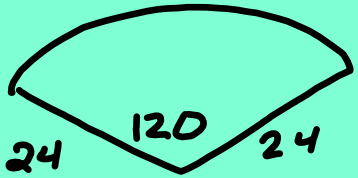
$$A = \frac{CA}{360}\pi r^2$$

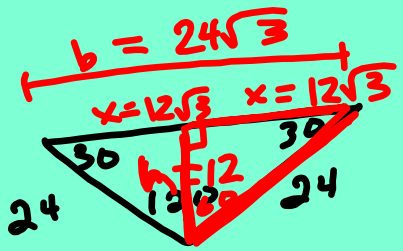
$$= \frac{208}{360}\pi(10)^2$$

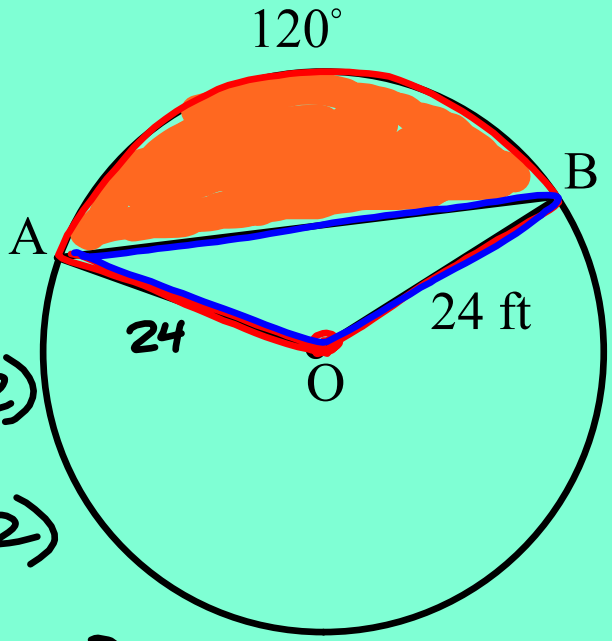
$$= \frac{26}{\cancel{45}_{9}}\pi(\cancel{100}^{20})$$

$$\boxed{A = \frac{520\pi}{9}\text{ cm}^2 \approx 181.5\text{ cm}^2}$$

5. Find the area of the shaded region. Round your answer to the nearest tenth.







$A = \frac{CA}{360}\pi r^2$

$= \frac{120}{360}\pi(24)^2$ — $A = \frac{1}{2}bh$

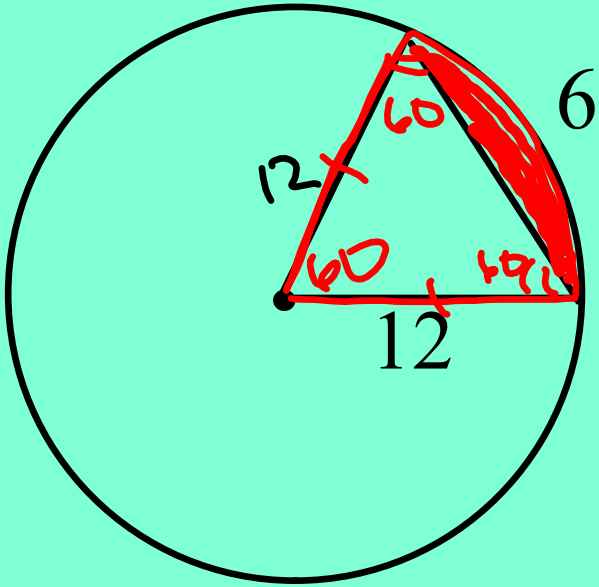
$= \frac{1}{3}\pi(576)$ — $\frac{1}{2}(24\sqrt{3})(12)$

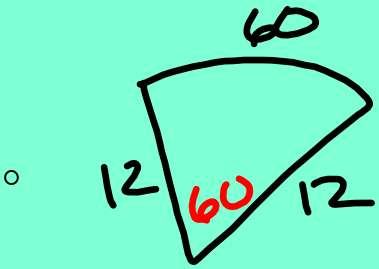
$(12\sqrt{3})(12)$

$A = 192\pi - 144\sqrt{3}\ ft^2$

$A \approx 353.8\ ft^2$

6. A circle has a radius of 12 cm. Find the area of the shaded region.





$$\frac{CA}{360}\pi r^2 - \frac{s^2\sqrt{3}}{4}$$

$$\frac{60}{360}\pi(12)^2 - \frac{12^2\sqrt{3}}{4}$$

$$\frac{1}{6}\pi(144) - \frac{144\sqrt{3}}{4}$$

$$24\pi - 36\sqrt{3}\ un^2$$

$A_{SQ} = bh$

$A_{rect} = bh$

$A_{parallelogram} = bh$

$A_{rh} = \frac{1}{2} d_1 d_2$ or $A = bh$

$A_{KITE} = \frac{1}{2} d_1 d_2$

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

$A_{\triangle} = \frac{s^2\sqrt{3}}{4}$

base & height have to be $\perp$

$A_{trapezoid} = \frac{1}{2} h(b_1 + b_2)$

a = apothem

$A_{\text{Regular Polygon}} = \frac{1}{2} aP$ P = perimeter

$C_{\odot} = 2\pi r$

Arc length $= \frac{CA}{360}(2\pi r)$

$A_{\odot} = \pi r^2$

Area of sector $= \frac{CA}{360} \pi r^2$

Assignment:

pgs 577-579 2,4,6,7-12,14,16,17-19 23-27,35,40