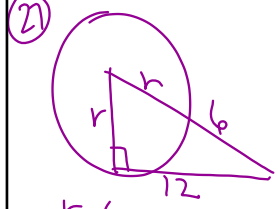
Homework ?'s

(21)



$r^2+12^2=(r+6)^2$

$r^2+144=r^2+12r+36$

$-36 \quad -36$

$\frac{108}{12}=\frac{12r}{12}$

$r=9$

	r	6
r	r^2	6r
6	6r	36

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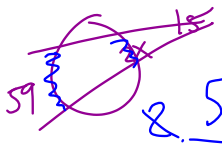
(14)



$\frac{59-2X=15.2}{2}$

$59-2X=30$

$-59 \quad -59$

$\frac{-2X=-29}{-2} \quad \frac{}{2}$

$X=14.5$

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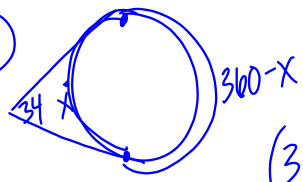
(12)



$\frac{(360-X)-X=34}{2}$

$360-2X=68$

$-360 \quad -360$

$\frac{-2X=-292}{-2} \quad \frac{}{-2}$

$X=146°$

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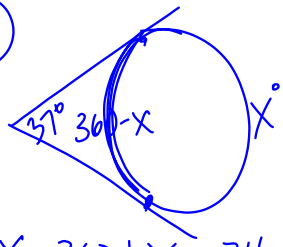
(18)



$X-(360-X)$

big − little

$\frac{}{2}=37$

$X-360+X=74$

$2X=74+360$

$\frac{2X=434}{2} \quad \frac{}{2}$

$X=217$

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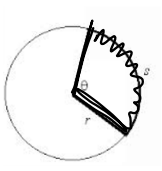
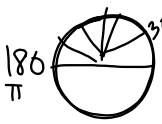
9.5 Arc Length and Conversions

Recall that the measure of an arc is the same as the measure of the central angle that intercepts it. The measure of the arc is in degrees, while the arc length is a fraction of the circumference. Thus, the measure of an arc is not the same as the arc length.

Arc Length Formula: $l=\frac{\pi\theta}{180°}r$

crust





$30° \quad \frac{\pi}{6}$

$S=\theta \cdot r$

θ in radians

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$30° \longleftrightarrow \frac{\pi}{6}$

Degrees radians

1. Divide by 180
2. multiply π top

$1.\ \frac{30}{180} \quad \frac{1}{6} \quad \frac{\pi}{6}$

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Find the arc length for the circles described below.

Example 1:
Find the arc length if the radius of a circle is 5 centimeters an the central angles is 72°. Write the answer is terms of pi and give a decimal approximation to the nearest thousandth.

$S = \theta \cdot r$ $r = 5$ $\theta = 72$ $\frac{2\pi}{5}$

$S = 2\pi \cdot 5$ $\frac{72}{180}$

2π cm or 6.28cm

Example 2:
Find the arc length if the radius of a circle is 7 inches an the central angles is 120°. Write the answer is terms of pi and give a decimal approximation to the nearest thousandth.

$r = 7$ $\theta = 120$ $\frac{2\pi}{3}$

$7 \cdot \frac{2\pi}{3}$ $\frac{14\pi}{3}$ in

≈ 14.661 in

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Another way to measure angles is with radians. The radian measure of a central angle is defined as the ratio of the arc length compared to the radius. Radian measures are expressed in terms of π.

Converting Between Radians and Degrees

To convert degrees to radians, multiply the angle by $\frac{\pi \text{ radians}}{180°}$.

To convert radians to degrees, multiply the angle by $\frac{180°}{\pi \text{ radians}}$.

Degrees to Radians

Example 3: Convert an angle of 25° to radian measure. Leave your answer in terms of π.

degrees → radians
1. divide by 180
2. change to fraction
3. multiply by π on top

Radians to Degrees

Example 4: Convert an angle of $\frac{\pi}{2}$ radians to degrees.

radian → degrees
1. cross off π
2. multiply by 180

$\frac{1}{2} \cdot 180$ 90°

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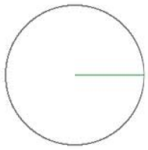
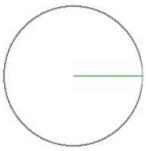
9.6 Arc Length and Area of a Sector

Draw a representation of each arc length, then find the arc length (θ is in radians). Round to the nearest thousandth.

Example 1: $\theta = \frac{\pi}{3}$, radius is 4 cm.



Example 2: $\theta = \frac{5\pi}{6}$, radius of 8 in.



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A region of a circle determined by two radii and the arc intercepted by the radii is called the sector of the circle (think a slice of pie). A sector is a fraction of a circle, so the ratio of the area of the sector to the area of the entire circle is equal to the measure of the central angle creating the sector to the measure of the entire circle.

Area of a Sector	
Angle is in Degrees	**Angle is in Radians**
$A = \frac{\pi\theta}{360} r^2$	$A = \frac{1}{2}\theta r^2$

Example 3: Find the area of a sector with radius 5 cm and central angle of 135°. Express your answer in terms of π and approximate to the nearest thousandths.

$A = \frac{1}{2} \cdot \theta \cdot r^2$ $\frac{135}{180}$

$\left(\frac{1}{2}\right)\left(\frac{3\pi}{4}\right)(5^2)$

$\frac{75\pi}{8}$ cm^2 ≈ 29.452cm^2

Example 4: Find the area of a sector with radius of 10 inches and a central angle of $\frac{5}{6}\pi$. Express your answer in terms of π and approximate to the nearest thousandths.

$r = 10$ $\theta = \frac{5\pi}{6}$

$\left(\frac{1}{2}\right)\left(\frac{5\pi}{6}\right)(10^2)$

$\frac{125}{3}\pi$ in^2 ≈ 130.810

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