10.2 Congruent Chords
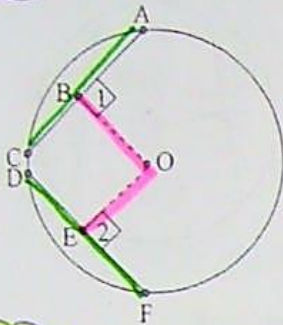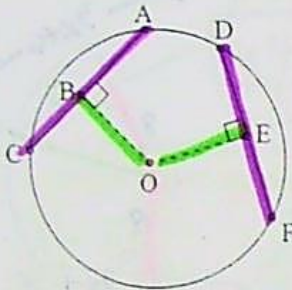
Theorem: If 2 chords are equidistant from the center of a circle, then they are congruent.
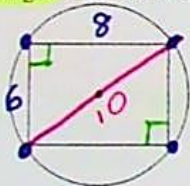
Complete: If $OB = OE$, then $\overline{AC} \cong \overline{DF}$ $=$ dist $\Rightarrow \cong$ chords

Theorem: If 2 chords are congruent, then they are equidistant from the center.
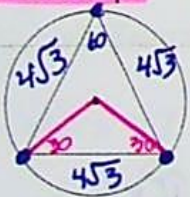
Complete: If $\overline{AC} \cong \overline{DF}$, then $\overline{OB} \cong \overline{OE}$. $\cong$ chords $\Rightarrow$ $=$ dist

1. A rectangle whose dimensions are 6 by 8 is inscribed in a circle. **Find the area of the circle in terms of pi.**

$D = 10$ $6-8-\boxed{10}$ $A = \pi r^2$ $r = \boxed{5}$

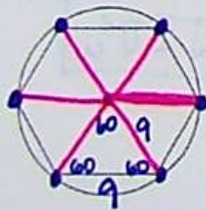$\pi (5_u)^2$

$\boxed{25\pi u^2}$

2. An equilateral triangle is inscribed in a circle. If the perimeter of the triangle is $12\sqrt{3}$, find the area of the circle in terms of pi.

$S = \dfrac{12\sqrt{3}}{3} = 4\sqrt{3}$ $r = \boxed{4}$

$A = \pi r^2$

$\pi (4_u)^2$

$\boxed{16\pi u^2}$

30	60	90
x	$x\sqrt{3}$	$2x$
2	$2\sqrt{3}$	4

$\underset{2\sqrt{3}}{\underset{30}{}} \quad \underset{4\sqrt{3}}{\underset{}{}} \quad \underset{2\sqrt{3}}{\underset{30}{}}$ $x \overset{60}{\diagup} 2x$

3. A regular hexagon is inscribed in a circle. If the perimeter of the hexagon is 54, find the circumference of the circle in terms of pi.

$E = \dfrac{360}{6} = 60°$ $S = \dfrac{54}{6} = 9$

$I = 180 - 60 = 120°$

$r = 9$

$\boxed{5}$

$C = 2\pi r$
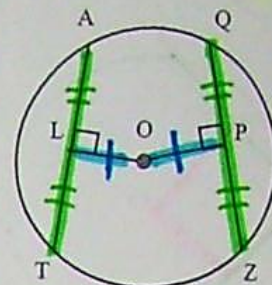
$2\pi (9_u)$

$\boxed{18\pi u}$

Geometry: 10.2 - Congruent Chords

Theorems:

| Chords in a circle are $\cong$ | $\Longleftrightarrow$ | Chords are equidistant from center |

Example on diagram:

$\overline{AT} \cong \overline{QZ}$ $\longleftrightarrow$ $\overline{LO} \cong \overline{OP}$

Examples:

1. Given: $\odot O$, LO = OM = 8, EF = 3x + 6, LZ = 2x - 1

Find: **a)** EF = $3x+6$ b) the area of $\odot O$

$3(8)+6$

$24+6$ $r=17$

If LO = OM, $\boxed{30u}$ $8-15-\boxed{17}$

then EF = DZ   family

$3x+6 = 2(2x-1)$ $A = \pi r^2$

$3x+6 = 4x-2$ $\pi (17)^2$

$-3x \qquad -3x$ $\boxed{289\pi u^2}$

$2+6 = x-2+2$

$\boxed{8 = x}$
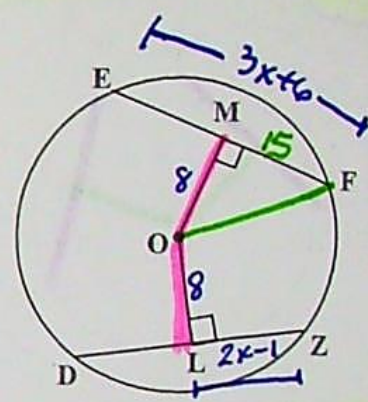
2. A square with a perimeter of 64 is inscribed in a circle. Find the circumference of the circle.

$\frac{64}{4} = 16$

$D = 16\sqrt{2}$ $C = 2\pi r$

$r = 8\sqrt{2}$ $\frac{2\pi(8\sqrt{2})}{}$

$\boxed{16\sqrt{2}\pi u}$

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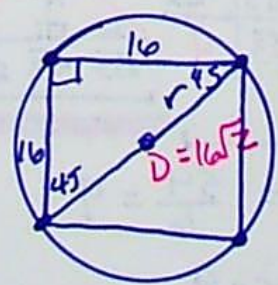
3. A *regular* hexagon with a perimeter of 48 is inscribed in a circle.
   a) How far is the center from each side?

$$\frac{48}{6} = 8 \quad \text{side}$$
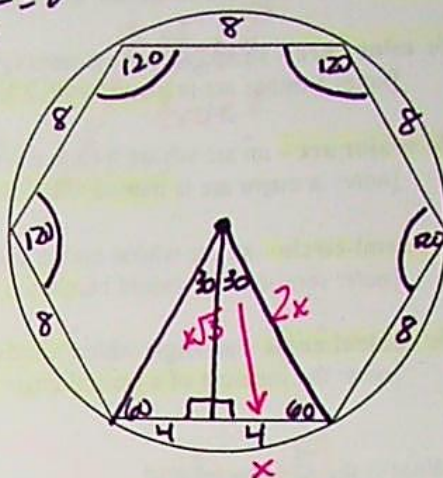
$$E = \frac{360}{6} = 60$$
$$I = 180 - E$$
$$I = 120°$$

30	60	90
x	x√3	2x
4	(4√3)	8

(a)

   b) Find the area of the circle.

$$A = \pi r^2 \qquad r = 8u$$
$$\pi (8u)^2$$
$$\boxed{64\pi u^2}$$

4. A rectangle with a length of 24 is inscribed in a circle with an area of 169π. Find the **width**, perimeter, and area of the rectangle.

$$A = \pi r^2$$
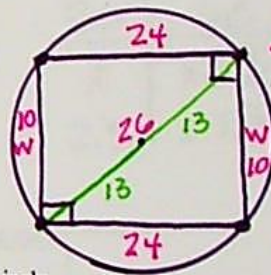$$A = 169\pi$$

$$\pi r^2 = 169\pi$$
$$\sqrt{r^2} = \sqrt{169}$$
$$\boxed{r = 13}$$

$$P = 2(l+w)$$
$$2(24+10)$$
$$2(34)$$
$$\boxed{68u}$$

$$A = lw$$
$$(24)(10)$$
$$\boxed{240 u^2}$$

$$\frac{w}{2} \quad \frac{24}{2} \quad \frac{26}{2}$$
$$5 - 12 - 13$$
$$\text{family}$$
$$\frac{w}{2} = 5$$
$$\boxed{w = 10}$$

5. A *regular* pentagon with a perimeter of 60 is inscribed in a circle. *To the nearest hundredth,* find the distance from the center to each side.

$$n = 5$$

$$s = \frac{60}{5} = 12u$$

$$E = \frac{360}{5} = 72$$

$$I = 180 - 72$$
$$108°$$

TOA

$$\tan 54 = \frac{x}{6}$$

$$x = 6(\tan 54)$$

$$\boxed{x \approx 8.26u}$$

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