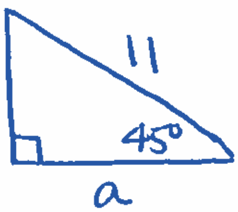
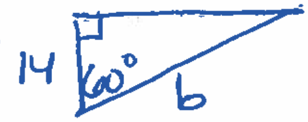
12-2 Chords and Arcs

✓ Check your skills needed at top of p. 670.

Find the value of each variable. Leave your answers in simplest radical form. (use special right △ rules)

① 

② 

③ 

÷ by $\sqrt{2}$ to find a

$\frac{11}{\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}} = \boxed{\frac{11\sqrt{2}}{2}} = a$

rationalize the denominator

÷ hyp by $\sqrt{2}$ = leg

$c = \frac{5\cancel{\sqrt{2}}}{\cancel{\sqrt{2}}}$

this time the radicals cancel so $\boxed{c = 5}$

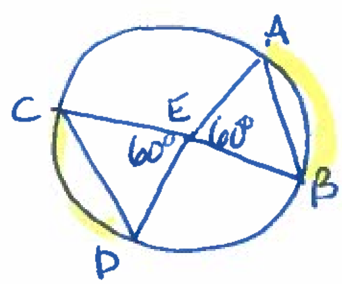
in a 30°-60°-90° △

hyp = leg · 2

$b = 14 \cdot 2$

$\boxed{b = 28}$

Thm 12-4



Within a circle or in ≅ circles

1) ≅ central ∠'s have ≅ chords

if m∠AEB ≅ ∠CED, then $\overline{AB} \cong \overline{CD}$

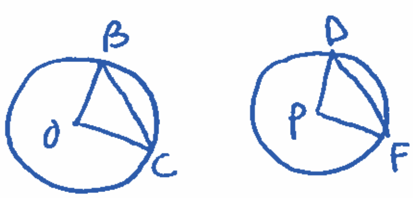
2.) ≅ chords have ≅ arcs.

if $\overline{AB} \cong \overline{CD}$, then $\overset{\frown}{AB} \cong \overset{\frown}{CD}$.

3.) ≅ Arcs have ≅ central ∠'s.

If $\overset{\frown}{AB} \cong \overset{\frown}{CD}$, then m∠CED ≅ m∠AEB.

Ex 1

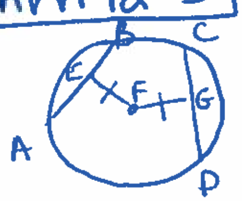


In the diagram ⊙O ≅ ⊙P.

Given $\overline{BC} \cong \overline{DF}$; what can you conclude?

congruent chords have congruent arcs, so $\overset{\frown}{BC} \cong \overset{\frown}{DF}$.

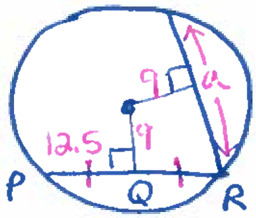
Thm 12-5



- IF $\overline{EF} \cong \overline{FG}$, then $\overline{AB} \cong \overline{CD}$.
- IF $\overline{AB} \cong \overline{CD}$, then $\overline{EF} \cong \overline{FG}$.
- Chords equidistant from the center are ≅.
- ≅ chords are equidistant from the center.

Read through the Proof on p.671.
Make sure you can follow the statements + reasons in the proof.

ex 2

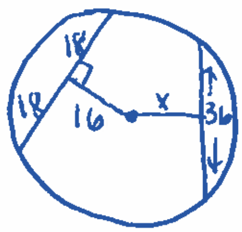


Find the value of a.

If the distance to both chords is 9, then each chord is $12.5(2) = 25$.

$\boxed{a = 25}$

ex 3



Find the value of x.

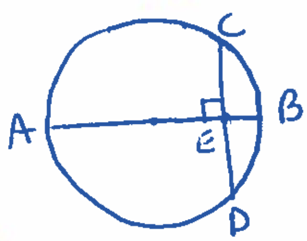
$18 + 18 = 36$

so since the chords are $\cong$, then they are both equidistant from the center

so $\boxed{x = 16}$.

Thm 12-6

In a circle, a diameter $\perp$ to a chord bisects the chord and its arcs.



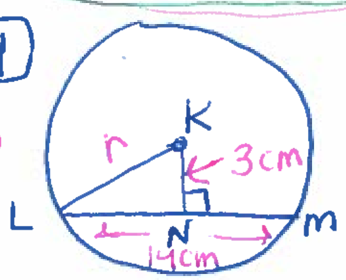
If $\overline{AB} \perp \overline{CD}$ then $\overline{CE} \cong \overline{DE}$ and $\overset{\frown}{CB} \cong \overset{\frown}{DB}$.

Thm 12-7 In a ⊙, a diameter that bisects a chord (that is not the diameter) is $\perp$ to the chord.

Thm 12-8 In a ⊙, the $\perp$ bisector of a chord contains the center of the ⊙.

ex 4

Round answer to the nearest tenth.



Find the radius.

$LN = \frac{1}{2}LM$

so

$LN = 7$

Do pyt. thm.

$3^2 + 7^2 = r^2$

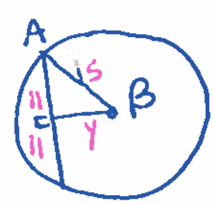
$9 + 49 = r^2$

$58 = r^2$

$7.6 \approx r$

ex#5

$BC \perp AC$. Find y (to the nearest tenth)



$11^2 + y^2 = 15^2$

$121 + y^2 = 225$

$-121 \quad\quad -121$

$\sqrt{y^2} = \sqrt{104}$

$y \approx 10.2$

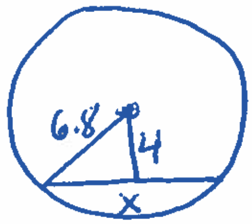
$\boxed{12.2 \text{ p.2}}$

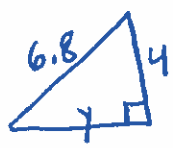
example #6

(Quick ✓ #3 on p.673)

a) Find the length of the chord

b) Find the distance from the midpoint of the chord to the midpoint of the minor arc.





$y^2+4^2=6.8^2$

$y^2+16=46.24$

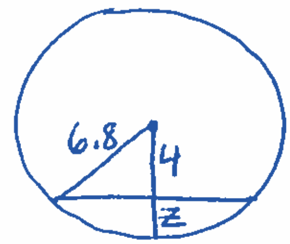
$\quad -16 \quad -16$

$y^2=30.24$

$y=5.5$

a) $x=2(5.5)=11$

b)



$z=6.8-4$

$\boxed{z=2.8}$

Try #23 & 24 on p.674