

Warm Up
April 27, 2015

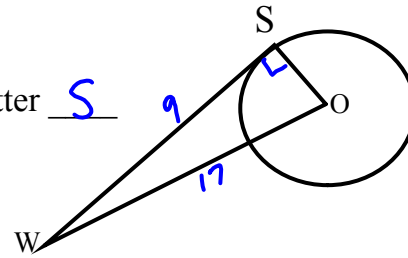


Fill in the blanks (SW is a tangent line)

1) The center is labeled with the letter O

2) The point of tangency is labeled with the letter S

3) The radius is the line \overline{SO}



SHOW YOUR WORK

4) Find the length of the radius if $OW = 17$ and $SW = 9$

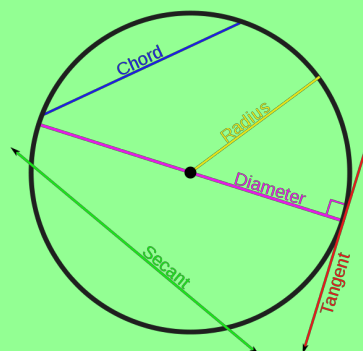
$$\begin{aligned} a^2 &= c^2 - b^2 \\ SO^2 &= 17^2 - 9^2 \\ &= 289 - 81 \\ &= 208 \\ SO &= \sqrt{208} \\ &= 14.4 \end{aligned}$$



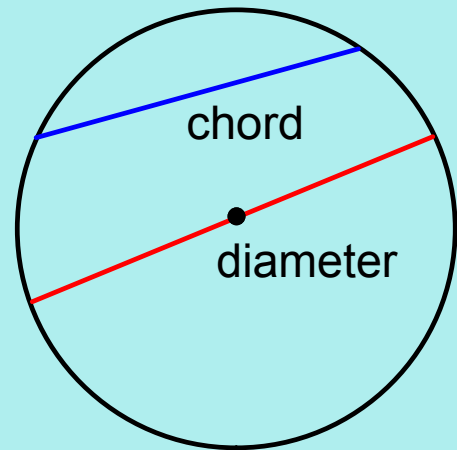
Section 8.2



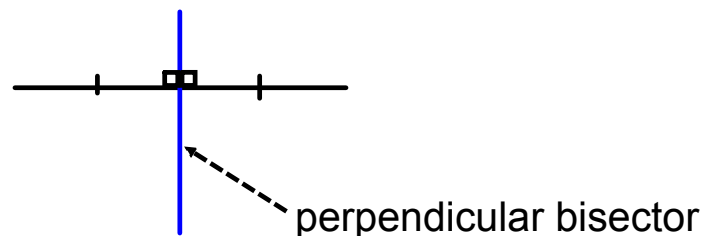
Properties of Chords in Circles



- A line segment that joins two points on a circle is a chord.
- A diameter of a circle is a chord through the centre of the circle.



Perpendicular bisector - intersects a line segment at 90° and divides the line segment into two equal parts.

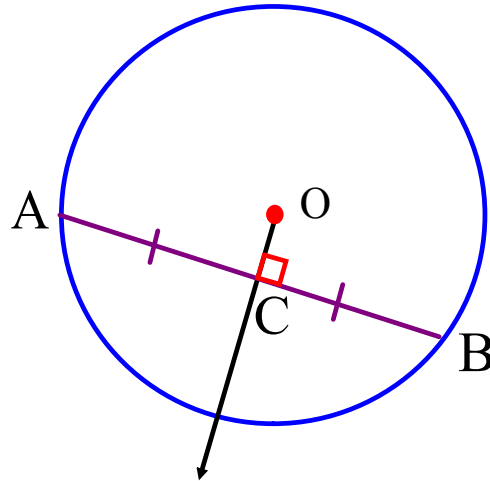


Perpendicular to a Chord Property 1

- A line drawn from the centre of a circle that is perpendicular to a chord bisects the chord. (It cuts the chord into two equal parts.)

$$\angle OCA = \angle OCB = 90^{\circ}$$

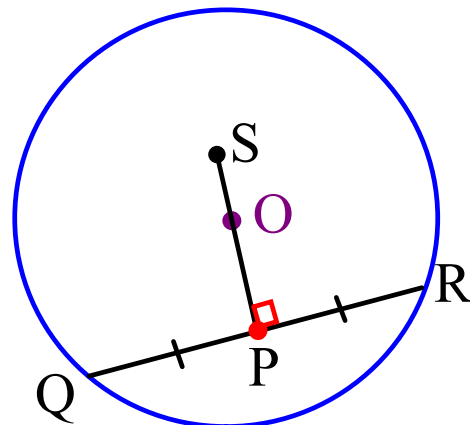
$$AC = CB$$



Perpendicular to a Chord Property 2

- The perpendicular bisector of a chord in a circle passes through the centre of the circle.

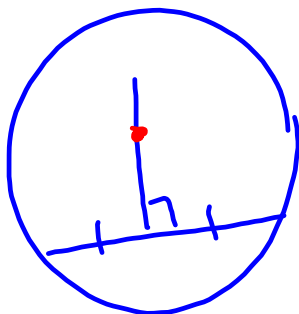
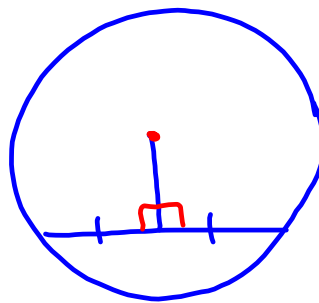
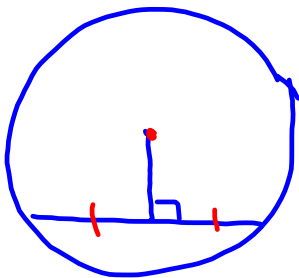
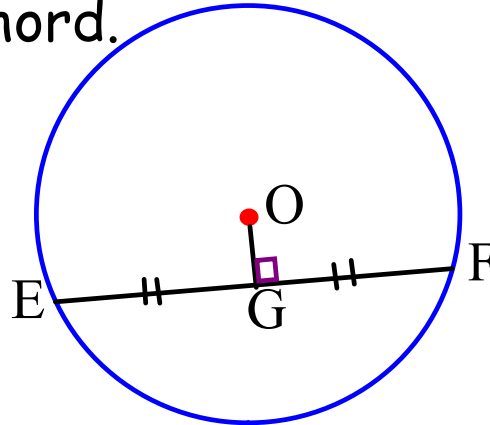
When $\angle SPR = \angle SPQ = 90^{\circ}$ and $RP = PQ$, then SP passes through the centre.



Perpendicular to a Chord Property 3

- A line that joins the centre of a circle and the midpoint of a chord is perpendicular to the chord.

When O is the centre and $EG = GF$, then $\angle OGE = \angle OGF = 90^\circ$.



If you have two features then you have the third automatically

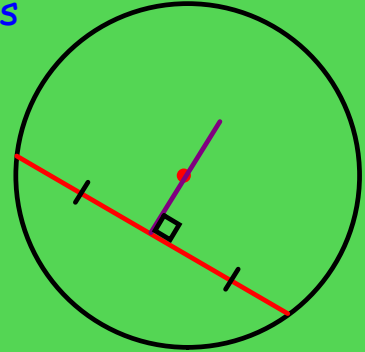
STOP!

Aren't they
all saying the
same thing?



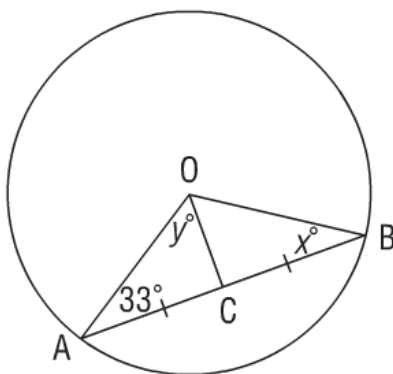
Yes!

When we see diagrams
like this, we know
that the lines are
perpendicular, and
the chord is cut in
two equal pieces.



Determining the Measure of Angles in a Triangle

Example #1. Determine the values of x° and y° .



Think: What do I know about angle C?

90°

Use angle sum of a triangle:

$180 - 90 - 33$

Therefore, $y^\circ = 57$

To find angle x:

We know the radii are equal, so $\triangle AOB$ is isosceles.

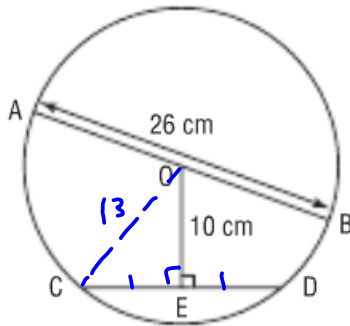
Then, $\angle OBA = \angle OAB$

Therefore, $x^\circ = 33$



Using the Pythagorean Theorem in a Circle

Example #2. What is the length of chord CD, to the nearest tenth?



Step 1) Draw in a radius that would make a right angle triangle

Step 2) Use Pythagorean Theorem to calculate CE (or ED)
(missing leg: $a^2 = c^2 - b^2$)

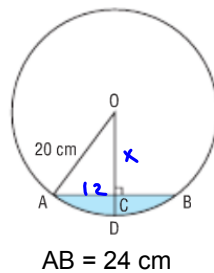
$$\begin{aligned} a^2 &= c^2 - b^2 \\ CE^2 &= 13^2 - 10^2 \\ &= 169 - 100 \\ &= 69 \\ CE &= \sqrt{69} \\ &= 8.3 \text{ cm} \end{aligned}$$

$$\begin{aligned} CE &= ED \\ x &= 8.307 \end{aligned}$$

Step 3)

Solving Problems Using the Property of a Chord and its Perpendicular

Example #3. Determine the length of CD.



Step 1) Find length of AC first

Step 2) Find the length of OC by Pythagorean Theorem

$$\begin{aligned} a^2 &= c^2 - b^2 \\ x^2 &= 20^2 - 12^2 \\ &= 400 - 144 \\ &= 256 \\ x &= \sqrt{256} \\ &= 16 \text{ cm} \end{aligned}$$

Step 3) OD is a radius as well
OD = OA = 20 cm

$$\begin{aligned} \text{Water depth} &= 20 - 16 \\ &= 4 \text{ cm} \end{aligned}$$

Step 4)



Homework :

p. 397 - 398

omit 8, 9

