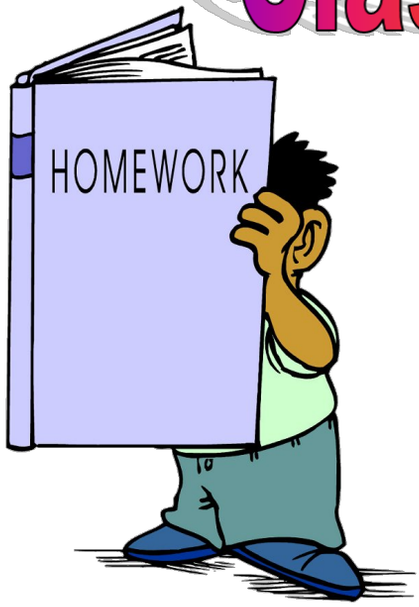
Curriculum Outcomes:

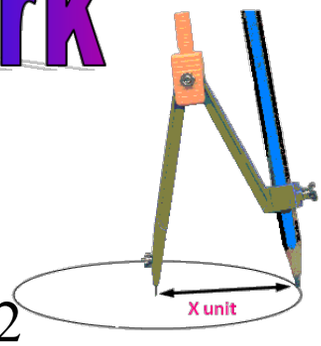
(SS1) Solve problems and justify the solution strategy using circle properties, including: the perpendicular from the centre of a circle to a chord bisects the chord; the measure of the central angle is equal to twice the measure of the inscribed angle subtended by the same arc; the inscribed angles subtended by the same arc are congruent; a tangent to a circle is perpendicular to the radius at the point of tangency.

Student Friendly:

How we can use the Chord properties to solve for unknown lengths. (Chord properties go hand and hand with Pythagorean theorem, angle sum of a triangle and isosceles triangles)

Class/Homework





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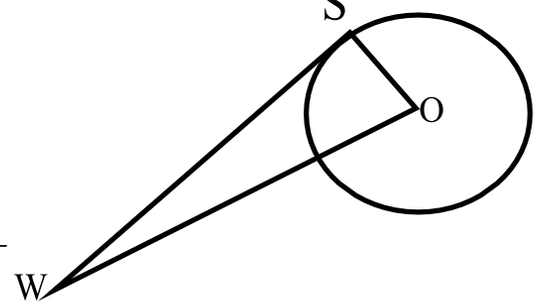
Day 1

3 ab
4a
5abc sketch
6abc sketch
7ab sketch

Day 2

8
9
13
14
16 c
17
20 (try)

Warm Up



Fill in the blanks

1) The Tangent is _____

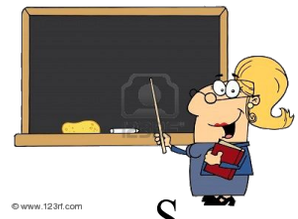
2) The center is labled with the letter _____

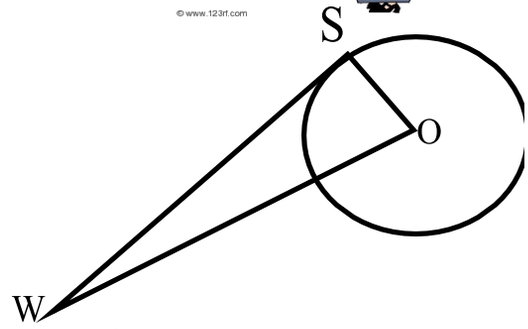
3) The point of tangency is labled with the letter ____

4) The radius is the line _____

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

Warm Up





Fill in the blanks

1) The Tangent is SW

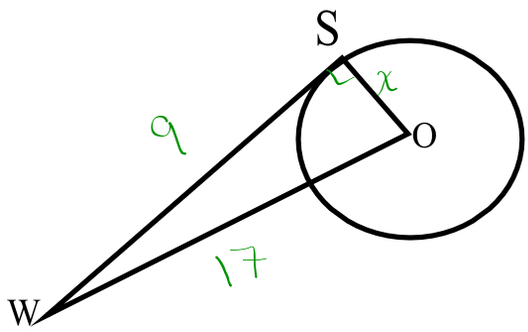
2) The center is labled with the letter O

3) The point of tangency is labled with the letter S

4) The radius is the line OS

SHOW YOUR WORK

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



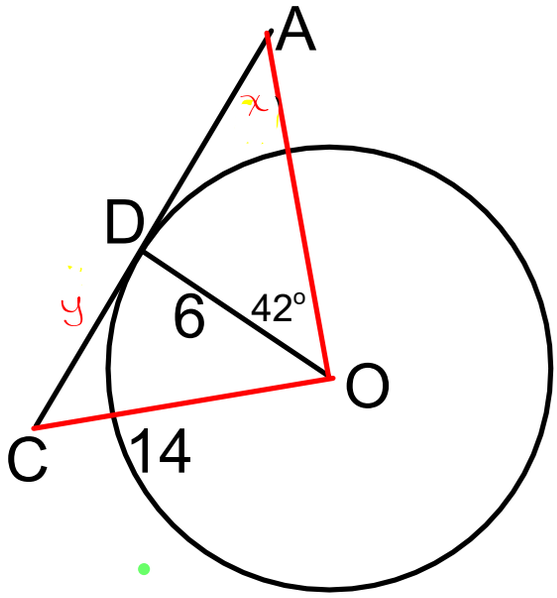
OS => radius => leg

$a^2 = 289 - 81$

$a^2 = 208$

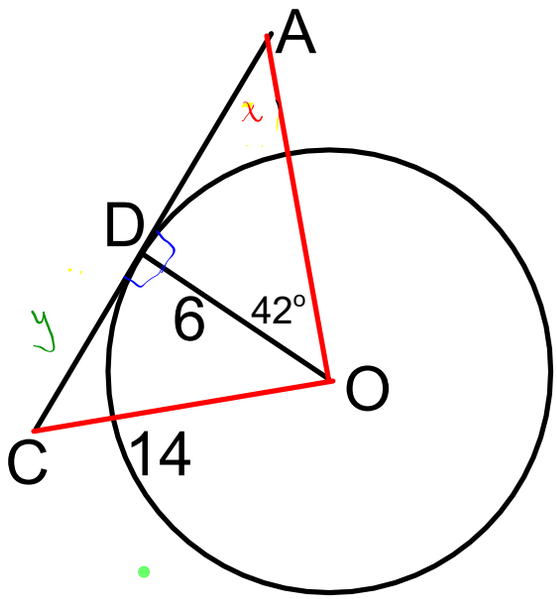
Warm Up

Determine the unknowns:



Warm Up

Determine the unknowns:



$a^2 = 196 - 36$

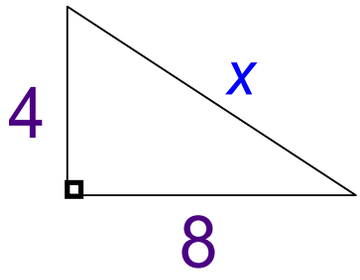
$a^2 = 160$

$a = 12.6$

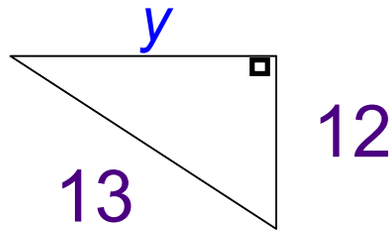
Calculating with **Tangents** We Only Use ...

1) Pythagorean Theorem

finding the hypotenuse → $c^2 = a^2 + b^2$



finding a side → $a^2 = c^2 - b^2$

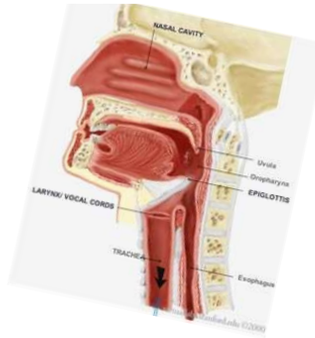


or

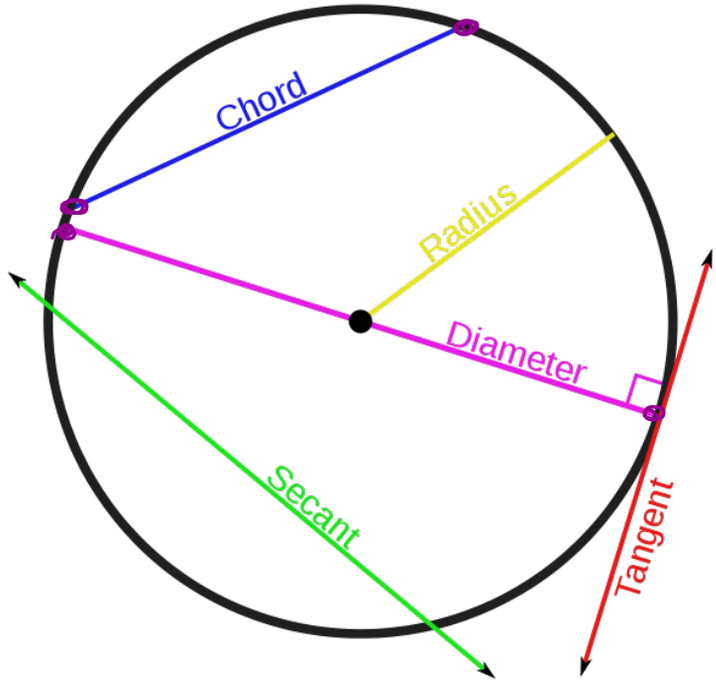
2) Angle Sum of Triangle (SATT)

Unknown Angle= 180° - 90° - known angle

Section 8.2

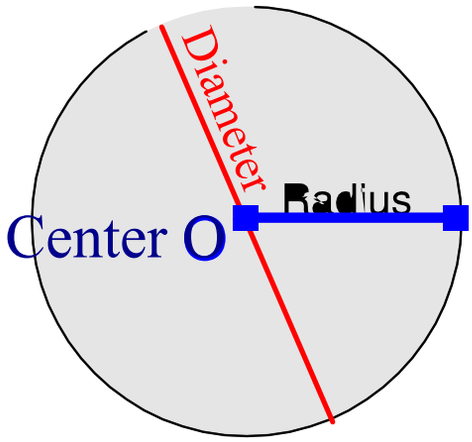


Properties of Chords in Circles



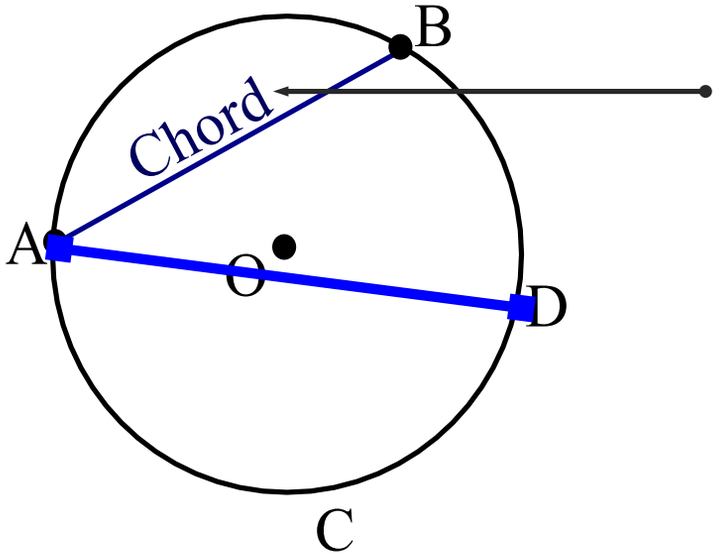
Properties of Circles & Terminology:

Circle - the set of all points that are equidistant from a fixed point.



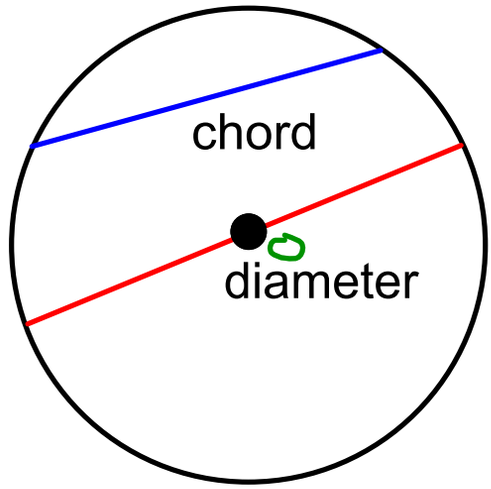
radius = $\frac{1}{2}$ (diameter)

diameter = 2 (radius)



- 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. It's the longest Chord.



Perpendicular bisector:

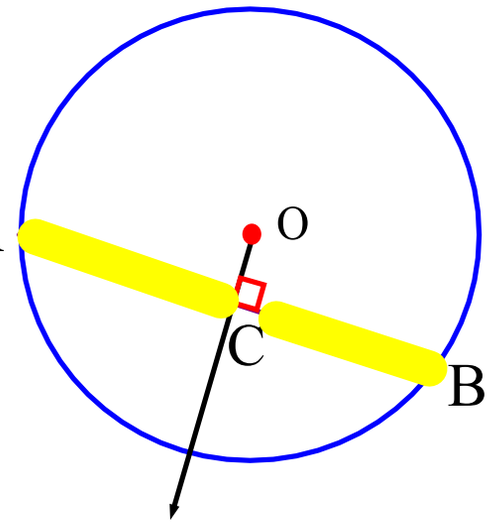
→ line that cuts a chord into two equal pieces at 90° angle

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.)

If OC is perpendicular to AB

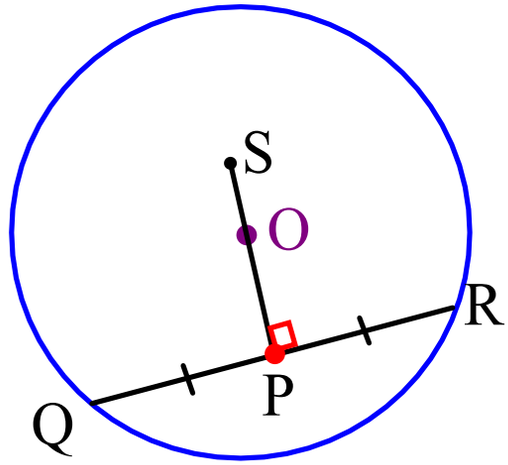
Then



Chord Property 2

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

A perpendicular bisector of a chord must go through the centre.



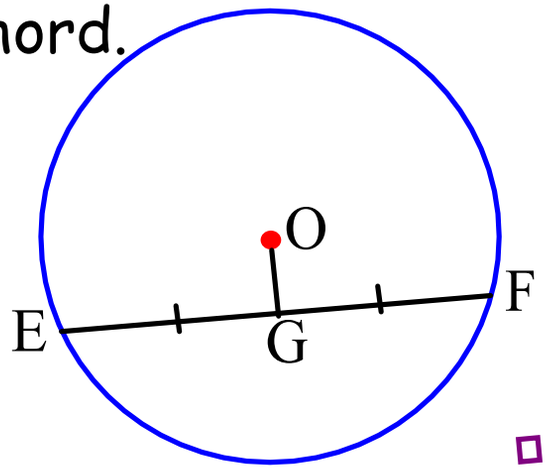
Perpendicular to a Chord Property 3

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

If O is the centre and EG = GF, then

[redacted]

(Chord P3)



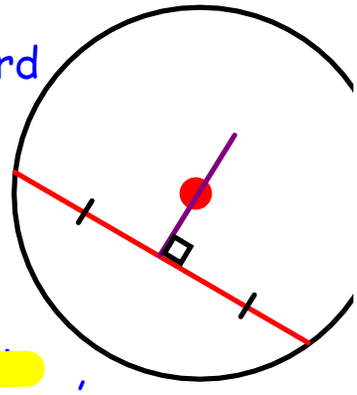
A line that comes from the centre of the circle and cuts the chord into two equal pieces is the perpendicular bisector

STOP!

Aren't they all saying the same thing?

Yes!
We know
that a

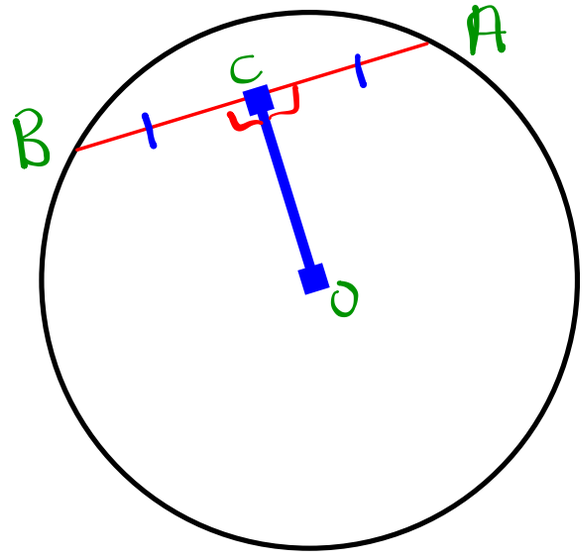
p[redacted]or of a cord



hits the cord at a[redacted],

the chord is cut in t[redacted]s,

and passes through t[redacted]



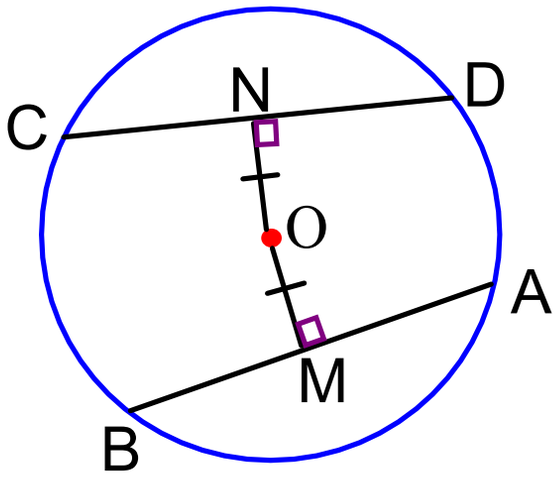
$BC = CA$ (chord PI)

$\angle OCA = 90^\circ$ (chord P3)

$\angle OCB = 90^\circ$

Perpendicular to a Chord Property 4

- Two chord that are equal distance from the center must be the same



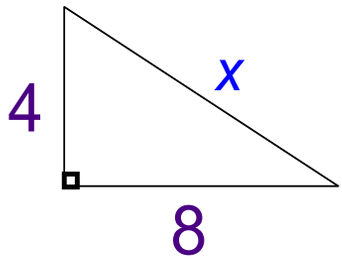
If OM = ON,
then AB = CD
OR
If AB = CD,
then OM = ON

Working With Chords Lengths We Only Use ...

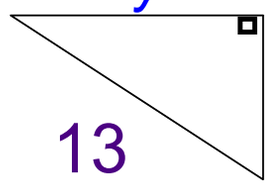
Note: the only reason they give you diameter is so you can use the radius

1) Pythagorean Theorem

finding the hypotenuse → $c^2 = a^2 + b^2$



finding a side → $a^2 = c^2 - b^2$



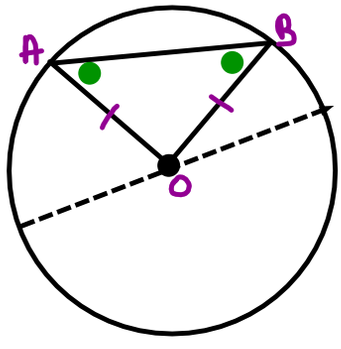
or

2) Angle Sum of Triangle (SATT)

Unknown Angle= 180° - 90° - known angle

or

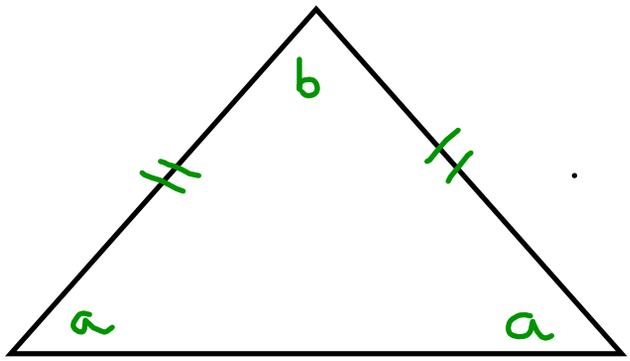
3) Isosceles Triangle (ITT)



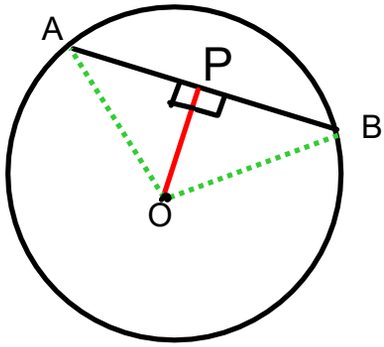
OA=0B⇒ radii

<OAB = <OBA (Iso Δ)

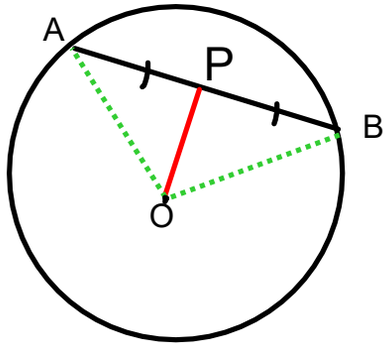
Itt



Chord Properties:

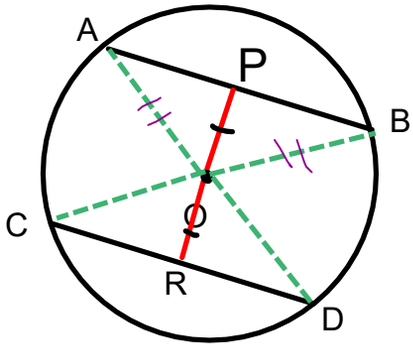


AP = PB (Chord P 1)



<APO = 90° (Chord P 3)

<BPO = 90° (Chord P 3)



AB = CD (Chord P 4)

To Solve use:

Angle= ___° (SATT) or (ITT)

Side= ___ cm (Pythagorean theorem)