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.

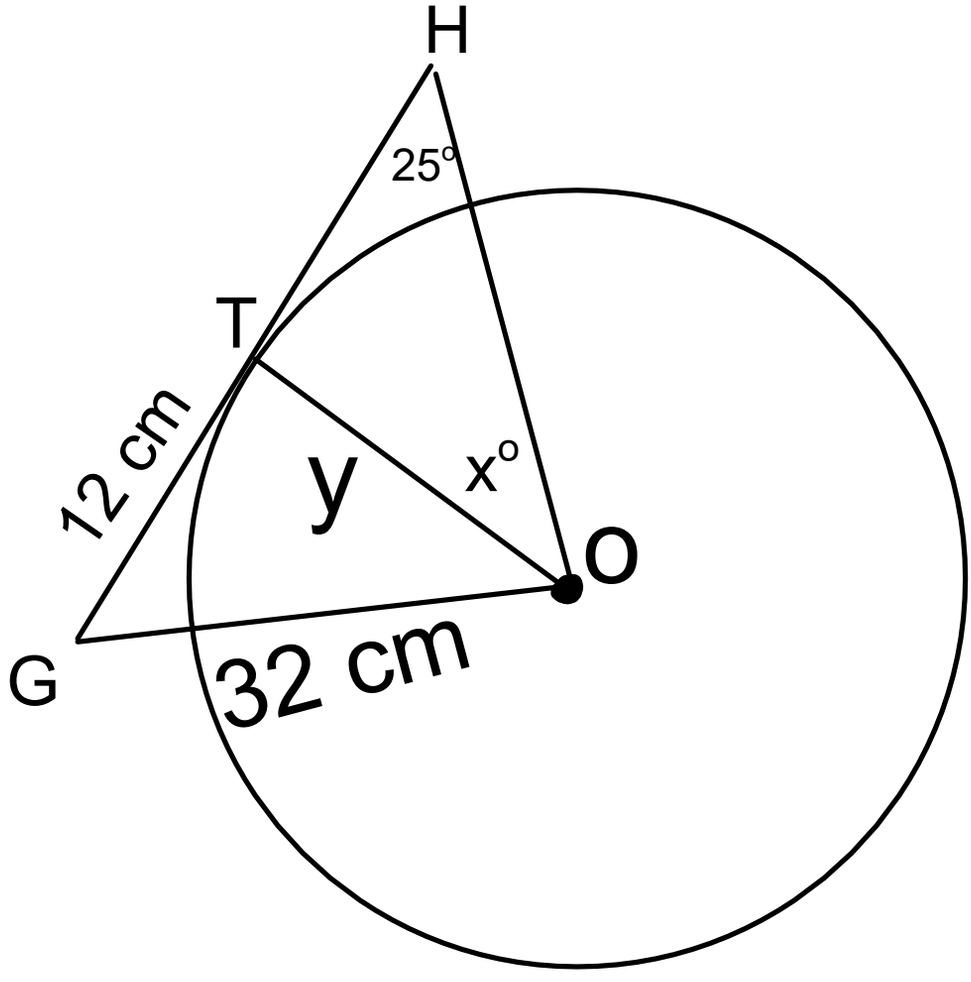
Student Friendly:

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)

Warm Up

Day 2

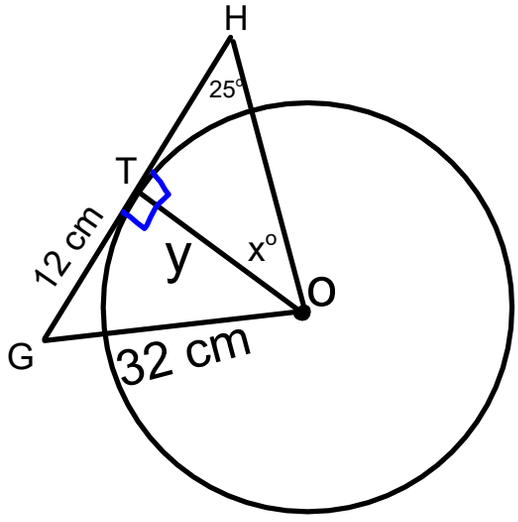
Determine the unknowns:



Warm Up

Day 2

Determine the unknowns:



$\angle OTH = 90^\circ$
$\angle OTG = 90^\circ$ } (Tang P)

$x = 65^\circ$ (SATT)
or
$180 - 90 - 25$

$y \Rightarrow$ leg

$a^2 = c^2 - b^2$

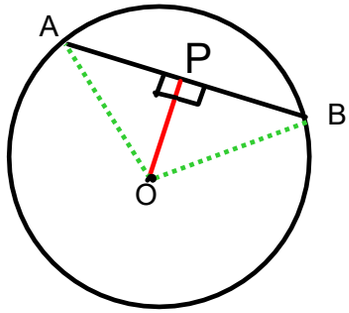
$a^2 = 32^2 - 12^2$

$a^2 = 1024 - 144$

$\sqrt{a^2} = \sqrt{880}$

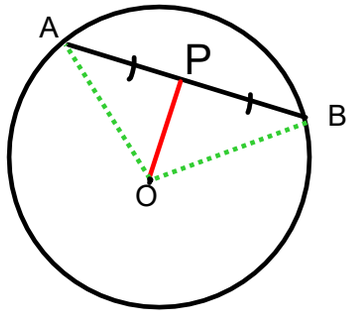
$a = 29.7$ cm

Chord Properties:



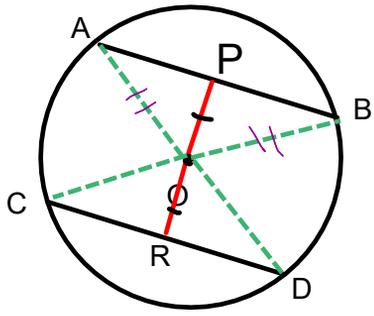
<OPB=<OPA = 90° (Given)

AP = PB (Chord P 1)



AP=PB (Given)

<APO =<BPO = 90° (Chord P 3)



If OP =OR (Given)

AB = CD (Chord P 4)

If AB= CD (Given)

OP = OR (Chord P 4)

To Solve use:

Angle= ___° (SATT) or (ITT)

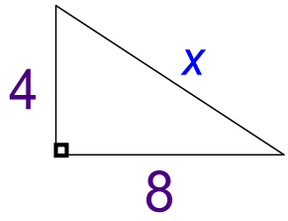
Side= ___ cm (Pythagorean theorem)

Working With Chords Lengths We Only Use ...

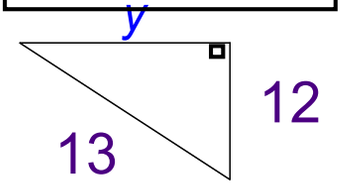
Note: the only reason they give you diameter is so you can use the radius

1) Pythagorean Theorem

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



finding a side → $a^2 = c^2 - b^2$



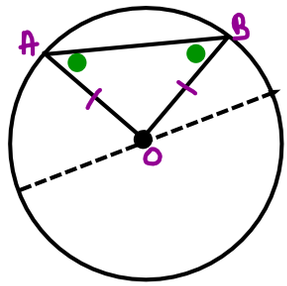
or

2) Angle Sum of Triangle (SATT)

Unknown Angle= 180° - 90° - known angle

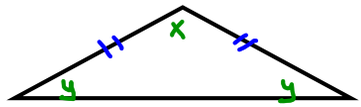
or

3) Isosceles Triangle (ITT)



OA=0B⇒ radii

<OAB = <OBA (Iso Δ)



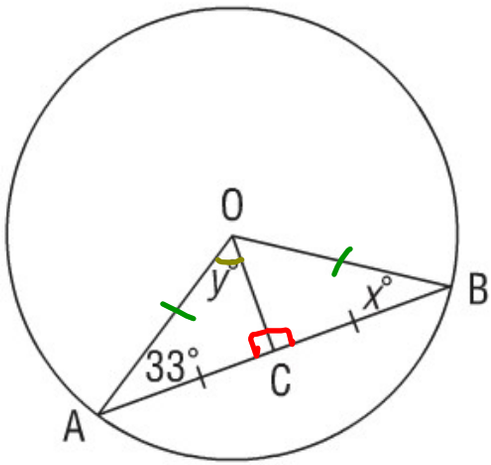
$x + 2y = 180°$

$x = 180° - 2y$ (SATT)

$y = \frac{180 - x}{2}$ (ITT)

Determining the Measure of Angles in a Triangle

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



- AC = CB (given)

∠OCA = ∠OCB = 90° (Ch P3)

OB = OA (radii)

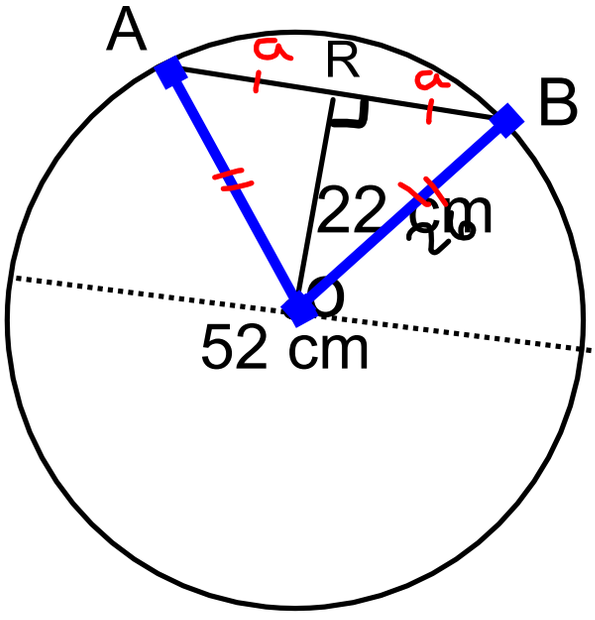
x = ∠OBA = 33° (Itt)

y = ∠AOC = 57° (SATT)

180 - 90 - 33

Warm Up

What is the length of the cord AB?

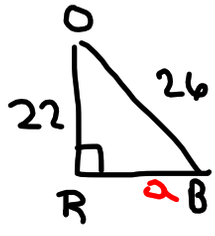


radius = 26

OB = OA = 26 (radii)

∠ORB = ∠ORA = 90° (given)

AR = BR (chpt)



RB => leg

$a^2 = c^2 - b^2$

$a^2 = 26^2 - 22^2$

$a^2 = 676 - 484$

$\sqrt{a^2} = \sqrt{192}$

$a = 13.9$

AB = 2(13.9)

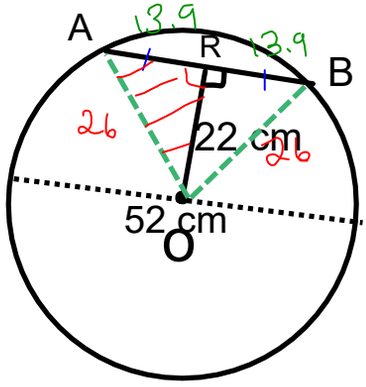
= 27.8 cm

Warm Up

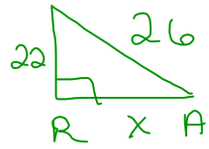
Day 2

Determine the unknowns:

What is the length of the cord AB?



AR = BR (Chord 1)



R A

$a^2 = c^2 - b^2$

$a^2 = 26^2 - 22^2$

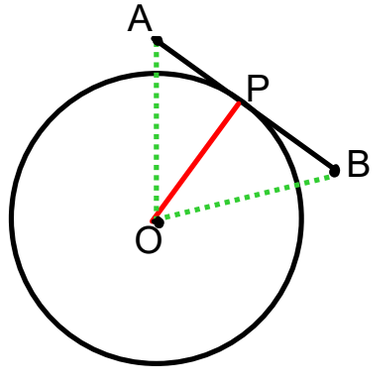
$a^2 = 676 - 484$

$\sqrt{a^2} = \sqrt{192}$

$a = 13.9$

$AB = 2(13.9)$

$= 27.8\text{cm}$



Tangent Properties:

<APO = 90° (Tang P)

<BPO = 90° (Tang P)

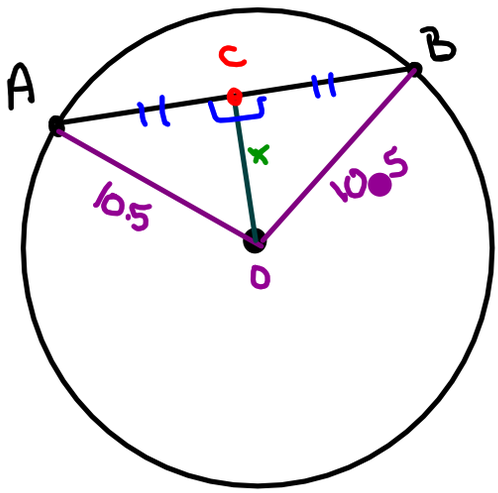
To Solve use:

Angle= ___° (SATT)

Side= ___ cm (Pythagorean theorem)

EXAMPLE...

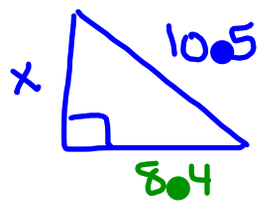
A chord that is 16.8 cm in length, is drawn in a circle that has a ~~diameter of 21~~ cm. How far is the chord from the center of the circle? radius = 10.5



$OA = OB = 10.5$ (radii)

$AC = CB = 8.4$ (chP3)

$\angle ACO = \angle BCO = 90°$ (chP1)



$a^2 = c^2 - b^2$

$a^2 = 10.5^2 - 8.4^2$

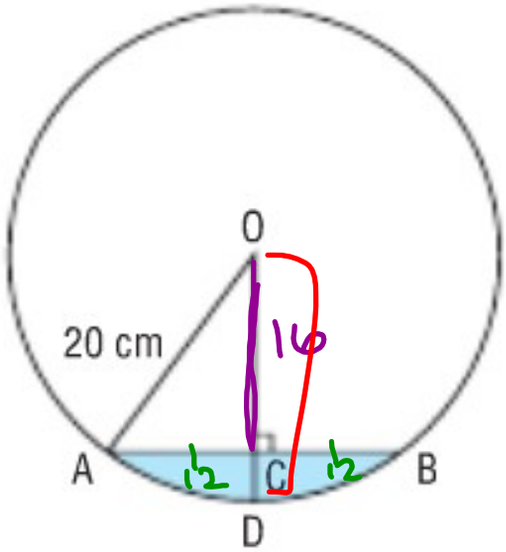
$a^2 = 39.69$

$a = 6.3$

$OC = 6.3$

Solving Problems Using the Property of a Chord and its Perpendicular

Example #3. Determine the length of CD. AB = 24 cm



$OA = OB = 20$ (radii)

$\angle OCA = \angle OCB = 90°$ (given)

$AC = CB = 12$ (ch P1)

OC =>

$a^2 = c^2 - b^2$

$a^2 = 20^2 - 12^2$

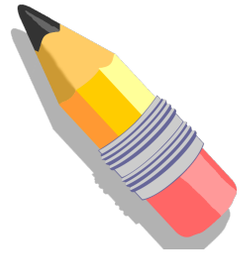
$\sqrt{a^2} = \sqrt{256}$

$a = 16$

$CD = 20 - 16$

$= 4$

Homework:



p.397 - 398

Questions: 3, 4, 5,

6, 7(b), 10(a), 11, 14, 15