Curriculum Outcomes:

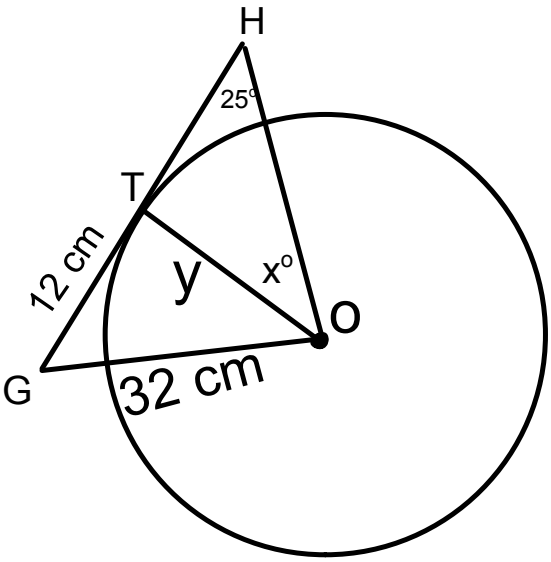
(SS1) Solve problems and justify the solution strategy using circle properties, including: the perpendicular from the centre of a circle to a chord bisects the chord; the measure of the central angle is equal to twice the measure of the inscribed angle subtended by the same arc; the inscribed angles 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 tangent properties to solve for unknown lengths. (Tangent properties go hand and hand with Pythagorean theorem)

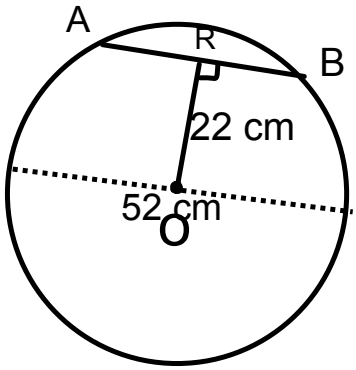
Warm Up

Day 2

Determine the unknowns:



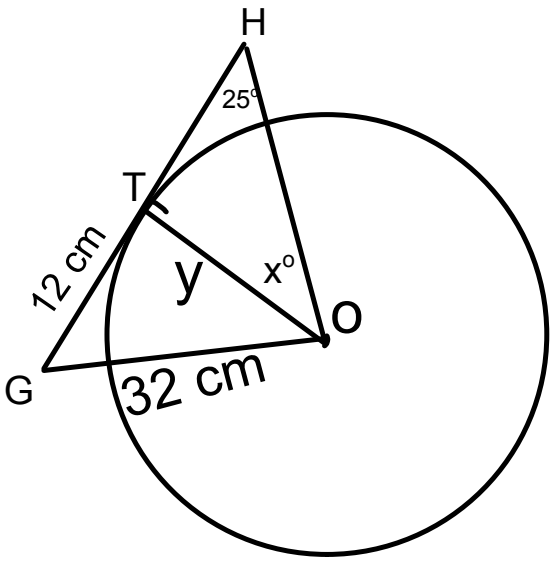
What is the length of the cord AB?



Warm Up

Day 2

Determine the unknowns:



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

$y \Rightarrow$ 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

$x = 65^\circ$ (SIATT)

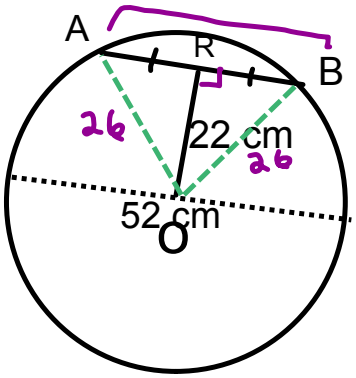
or

$180 - 90 - 25$

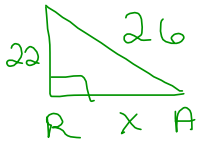
Day 2

Determine the unknowns:

What is the length of the cord AB?



$AR = BR$ (Chord ⊥)



RA

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

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

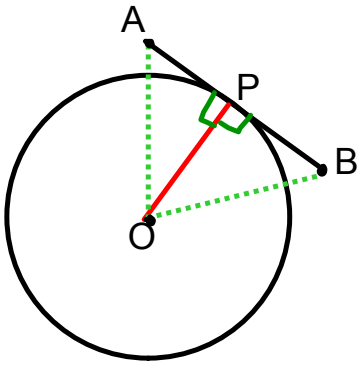
$a^2 = 676 - 484$

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

$a = 13.9$

$AB = 2(13.9)$

$= 27.8\text{cm}$



Tangent Properties:

<APO = 90° (Tang P)

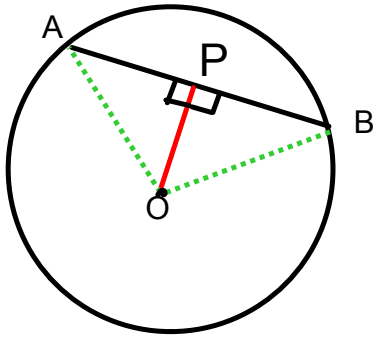
<BPO = 90° (Tang P)

To Solve use:

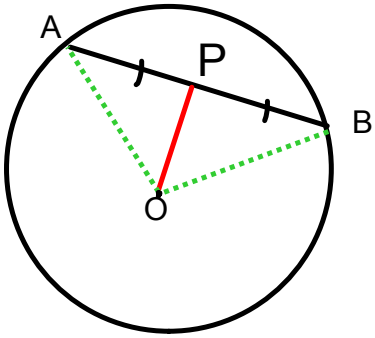
Angle= ___° (SATT)

Side= ___ cm (Pythagorean theorem)

Chord Properties:

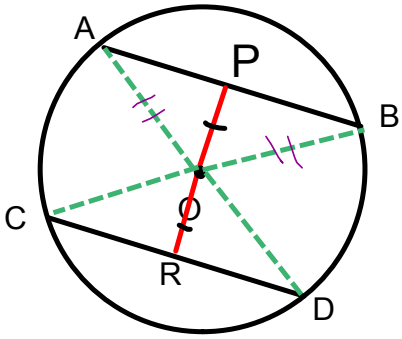


AP = PB (Chord P 1)



<APO = 90° (Chord P 3)

<BPO = 90° (Chord P 3)



AB = CD (Chord P 4)

PO = RO (Chord P4)

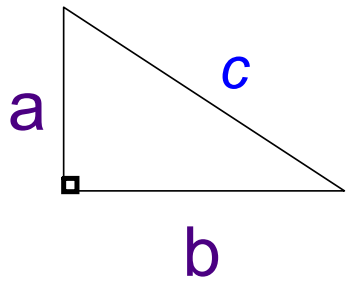
To Solve use:

Angle= ___° (SATT) or (ITT)

Side= ___ cm (Pythagorean theorem)

Unknown Sides

Pythagorean Theorem

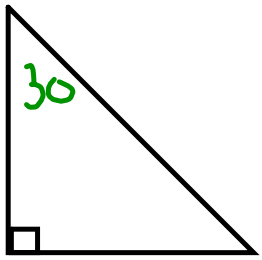


finding the hypotenuse → $c^2 = a^2 + b^2$

finding a side → $a^2 = c^2 - b^2$

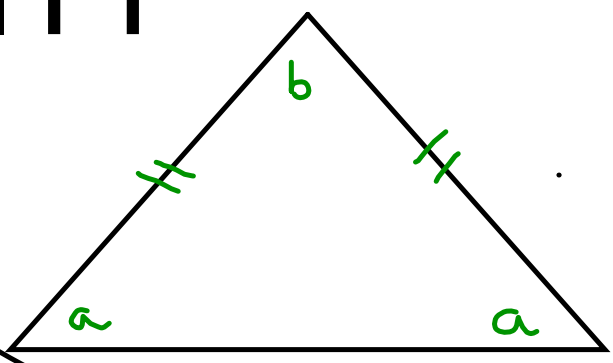
Unknown Angles

Angle Sum of a Triangle (SATT)



180° - 90° - known angle

ITT

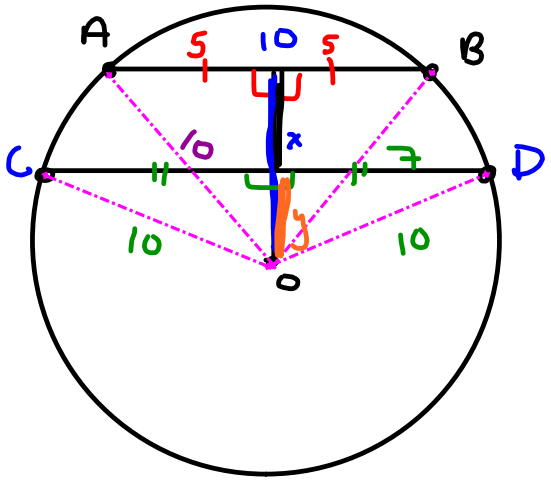


$a = \frac{(180 - b)}{2}$

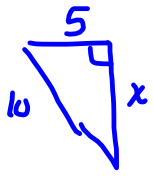
b= 180 -2a

EXAMPLE...

Two parallel chords, AB & CD, have lengths of 10 cm and 14 cm respectively. The diameter of the circle is 20 cm. Find the smallest possible distance that could separate these two chords.



Chord P



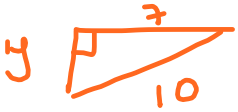
$x \Rightarrow$ leg

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

$a^2 = 10^2 - 5^2$

$\sqrt{a^2} = \sqrt{75}$

$a = 8.7$



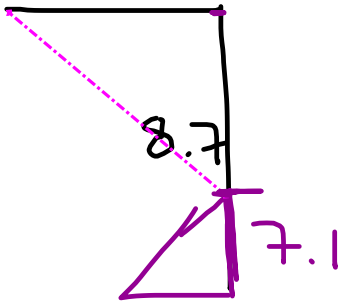
$y \Rightarrow$ leg

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

$a^2 = 10^2 - 7^2$

$\sqrt{a^2} = \sqrt{51}$

$a = 7.1$

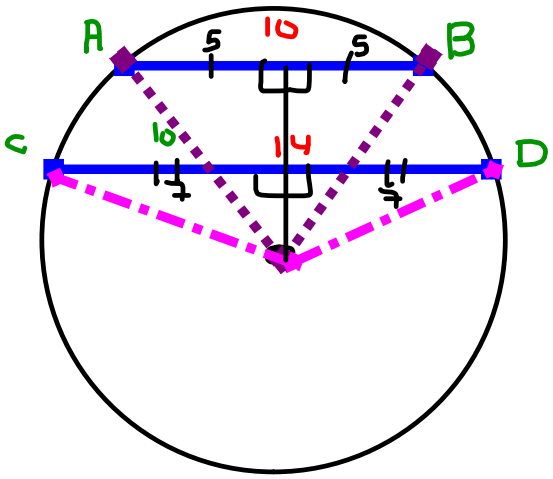


$8.7 - 7.1$

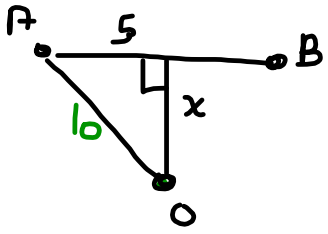
$= 1.6$

EXAMPLE...

Two parallel chords, AB & CD, have lengths of 10 cm and 14 cm respectively. The diameter of the circle is 20 cm. Find the smallest possible distance that could separate these twochords.



(Chord P)



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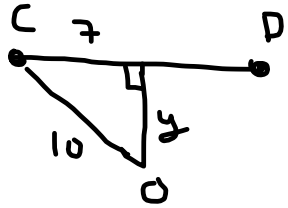


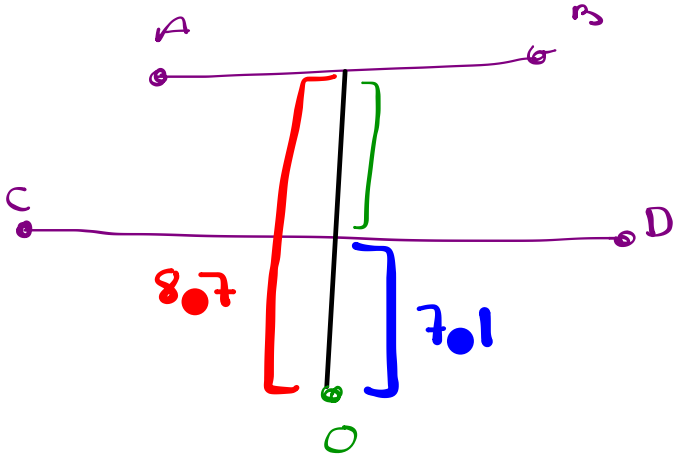
$y \Rightarrow$ leg

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

$a^2 = 10^2 - 7^2$

$\sqrt{a^2} = \sqrt{51}$

$a = 7.1$



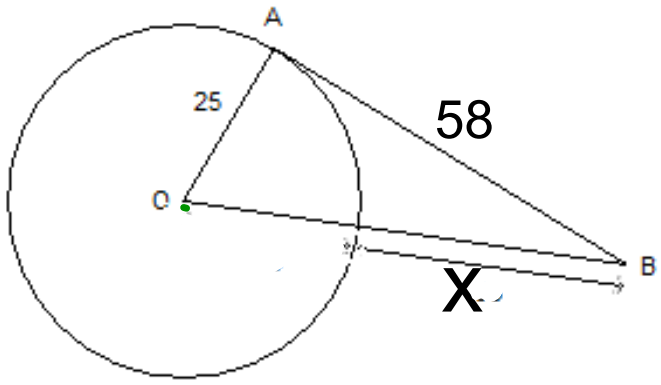
$8.7 - 7.1$

$= 1.6$

Review for Quiz

O is the centre of this circle and point A is a point of tangency.

Determine the value of x. If necessary, give your answer to the nearest tenth.



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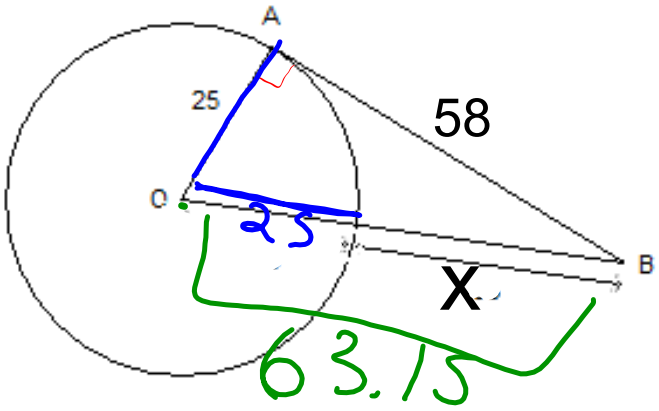


$\angle OAB = 90^\circ$ (Tang pl)

OB $\Rightarrow$ hyp

$c^2 = a^2 + b^2$

$c^2 = 58^2 + 25^2$

$c^2 = 3364 + 625$

$\sqrt{c^2} = \sqrt{3989}$

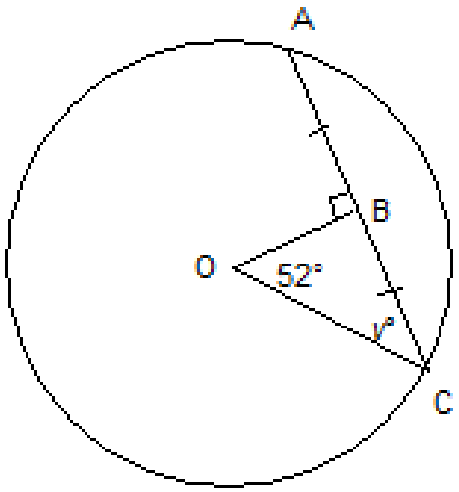
$c = 63.15$

$x = 63.15 - 25$

$= 38.16$

O is the centre of the circle.

Determine the value of $v°$.



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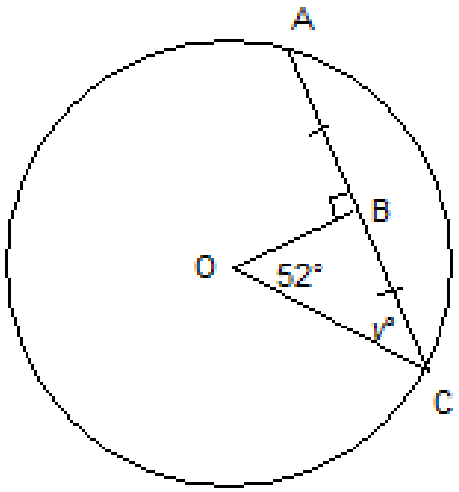


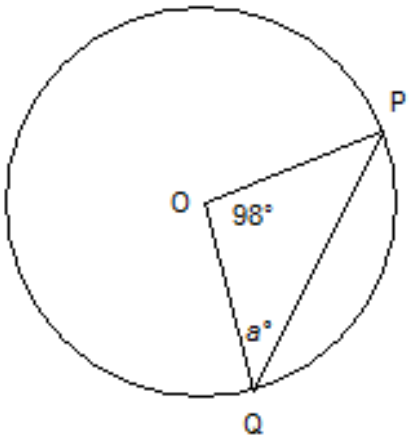
(chord ⊥)

$\angle OCB = y = 180 - 90 - 52$

$= 38°$ (SAT)

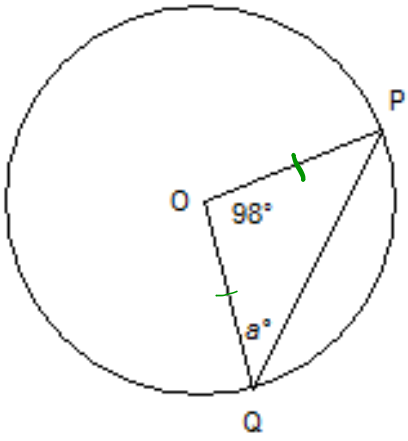
O is the centre of the circle.

Determine the value of $a°$.



O is the centre of the circle.

Determine the value of $a°$.



Chord P

$OP = OQ$ (radii)

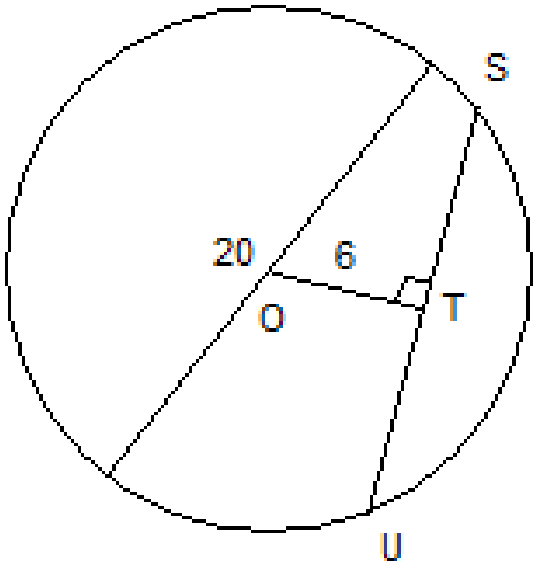
$a = \frac{180 - 98}{2}$

$a = \frac{82}{2}$

$a = 41°$ (ITT)

O is the centre of the circle.

Determine the value of "st" to the nearest tenth, if necessary.



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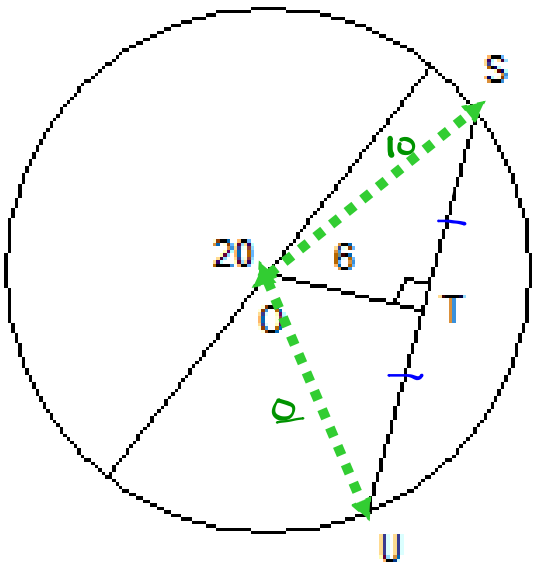


UT = ST (chord P)

St => leg

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

$a^2 = 10^2 - 6^2$

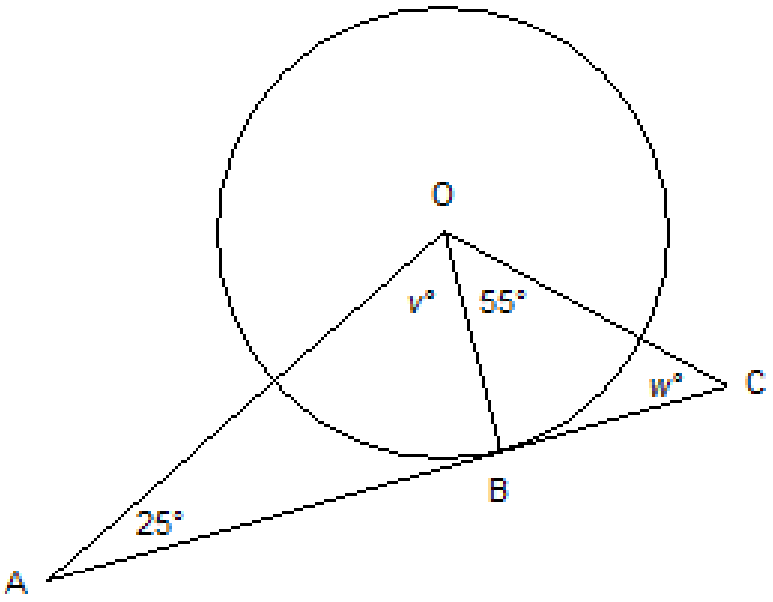
$a^2 = 100 - 36$

$a^2 = 64$

$a = 8$

ST = 8

13. O is the centre of this circle and point B is a point of tangency.
Determine the values of $v°$ and $w°$.



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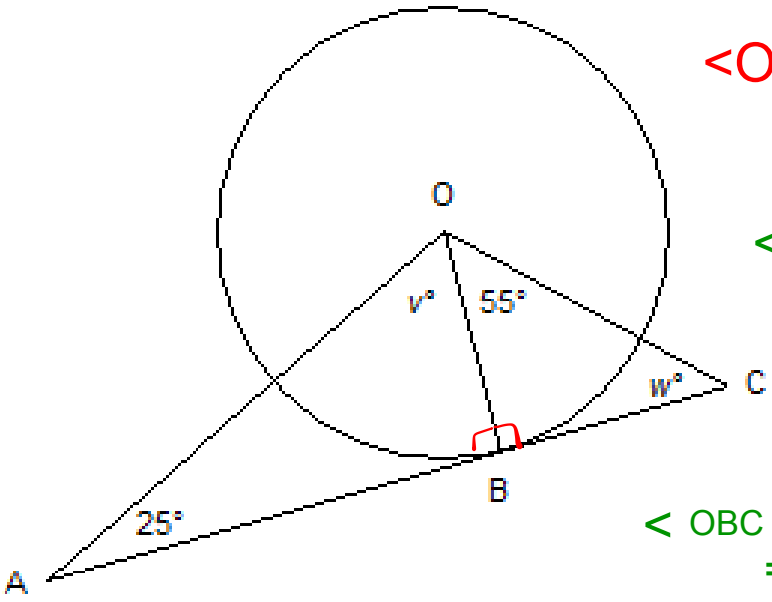

<OBC =90° (Tang P)

<OBA =90° (Tang P)

< AOB =V°
= 65° (SATT)

< OBC =W°
= 35° (SATT)