Curriculum Outcomes:

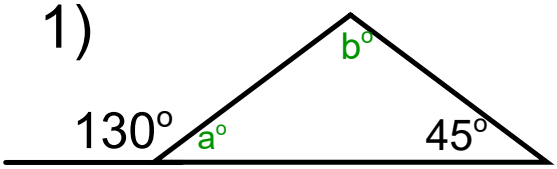
(SS1) Solve problems and justify the solution strategy using circle properties, including: the perpendicular from the centre of a circle to a chord bisects the chord; the measure of the central angle is equal to twice the measure of the inscribed angle subtended by the same arc; the inscribed angles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

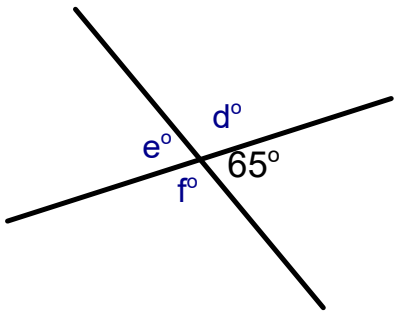
Warm Up

1)

1)



2)



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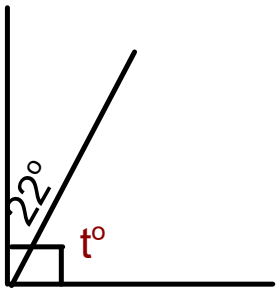

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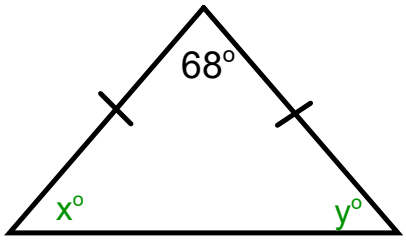
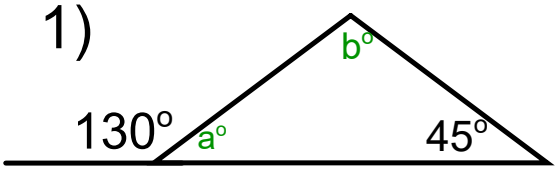


Warm Up

1)

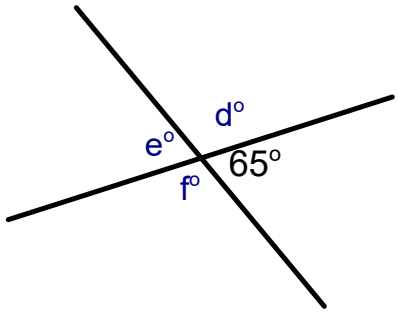
1)



$a^\circ = 50^\circ$ (SAT)

$b^\circ = 85^\circ$ (EAT) or SATT

2)

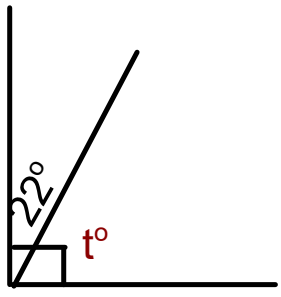


$e^\circ = 65^\circ$ (OAT) or (SAT)

$d^\circ = 115^\circ$ (SAT)

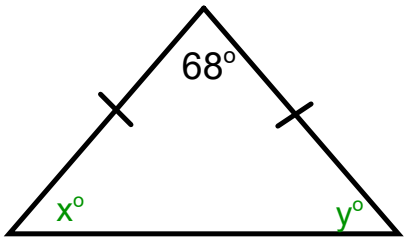
$f^\circ = 115^\circ$ (OAT) or (SAT)

3)



$t^\circ = 68^\circ$ (CAT)

4)

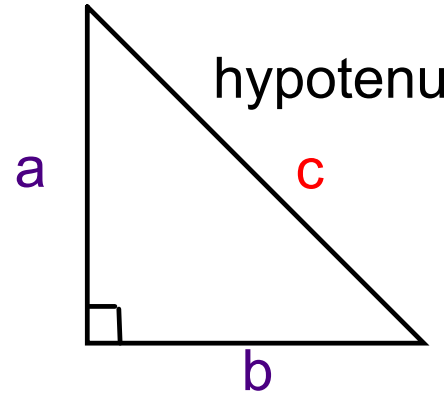


$x^\circ = \frac{180^\circ - 68^\circ}{2}$

$x^\circ = 56^\circ$ (ITT)

$y^\circ = 56^\circ$ (ITT)

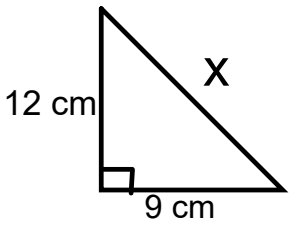
Review
Pythagorean Theorem



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

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

1)



X ⇒ Hyp

$c^2=a^{2+}\ b^2$

$c^2=12^2+9^2$

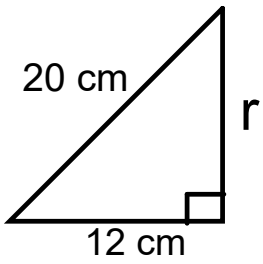
$c^2=144+81$

$c^2=225$

$c=\sqrt{225}$

c = 15 cm

2)



r ⇒ leg

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

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

$a^2=400-144$

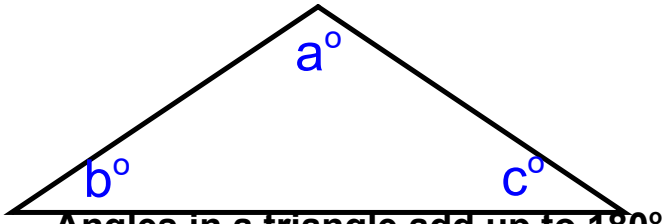
$a^2=256$

$a=\sqrt{256}$

a = 16 cm

Review

Sum of Angles in a Triangle Theorem (SATT)



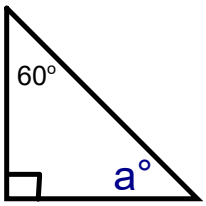
-Angles in a triangle add up to 180°

Rule:

Angles in a triangle add up to 180°

$a° + b° + c° = 180°$

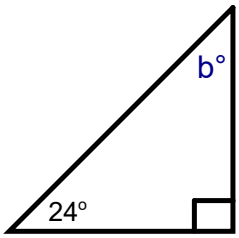
1)



$a° = 180° - 90° - 60°$

$a° = 30°$ (SATT)

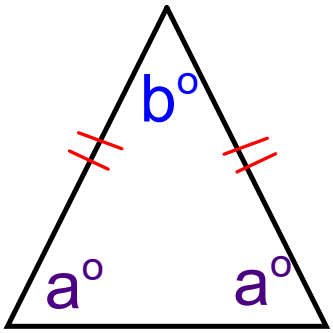
2)



$b° = 180° - 90° - 24°$

$b° = 66°$ (SATT)

Isosceles Triangle Theorem (ITT)



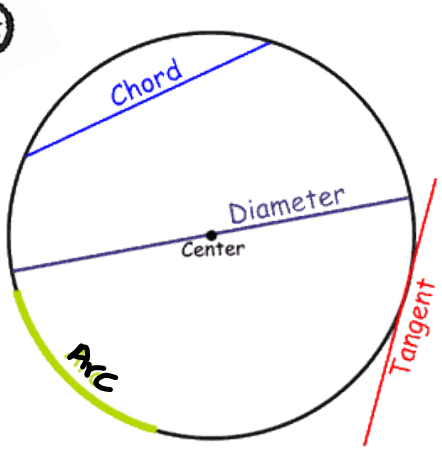
-Base angles in an isosceles triangles are equal

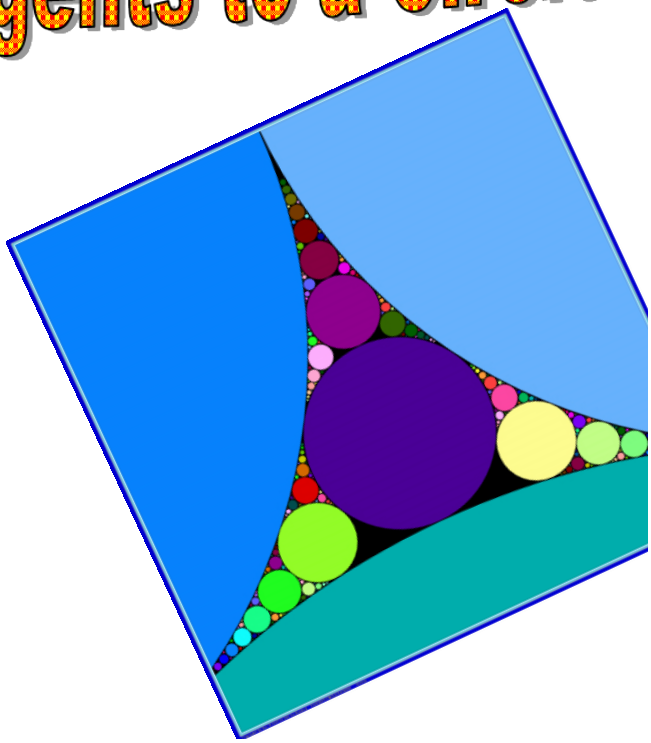
$$b = 180^\circ - a^\circ - a^\circ$$

$$a^\circ = \frac{180^\circ - b^\circ}{2}$$

Section 8.1

Properties of Tangents to a Circle

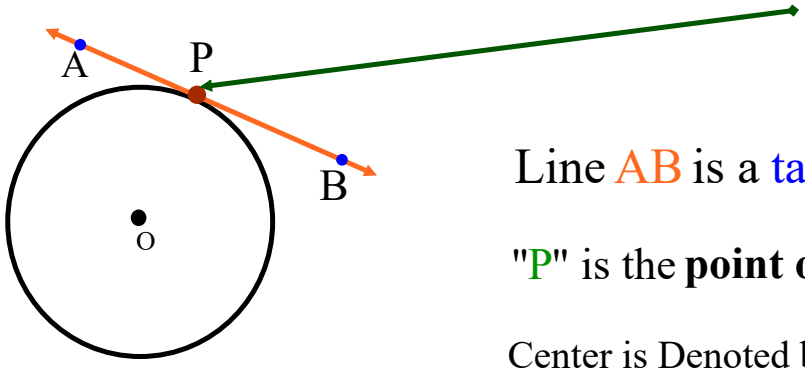




Tangent Properties

- **tangent -** a line that touches a circle/curve at only 1 point.
  - the point of contact is called the **point of tangency.**

ex:



Line AB is a tangent

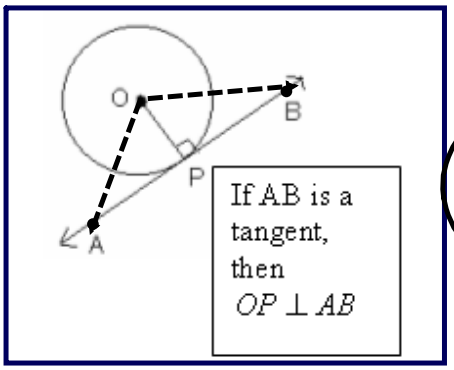
"P" is the **point of tangency**

Center is Denoted by "O"

Tangent Property 1:

A tangent to a circle is perpendicular to the radius at the point of tangency. <APO = <BPO = 90º (Tang P)

(3)



"Join O to B and you have formed a right triangle. Thus, you can use the Pythagorean Theorem to find side lengths." (OR Angle sum of triangle to find missing angles)

Wrap Up to Tangents

$< \_ \_ \_ = 90^{o}$ (Tang P)

Only two ways to solve Tangent Problems:

1) Angle sum of a triangle (SATT)

unknown angle= 180^{o} - 90^{o} - given angle

2) Pythagorean Theorem

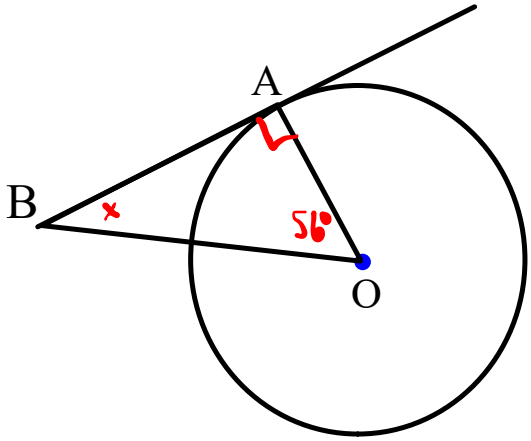
$c^2 = a^2 + b^2$ Hypotenuse

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

Determining the Measure of an Angle in a Triangle

1) Point O is the centre of a circle and AB is a Tangent to the circle. In ΔOAB, <AOB = 56°. Determine the measure of <OBA. Point A is the point of tangency.

(Show all Work)



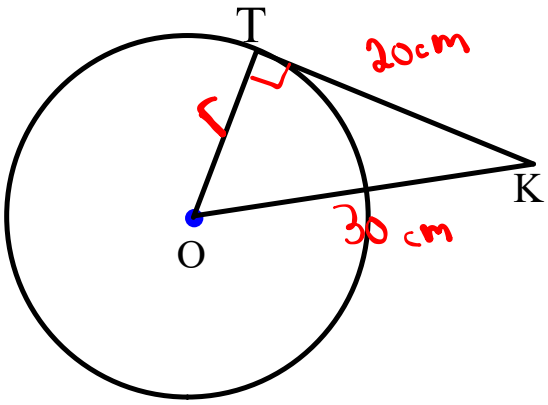
<OAB = 90° (Tang P)

<OBA = 180° - 90° - 56°

<OBA = 34° (SATT)

Using the Pythagorean Theorem in a Circle

2) Point O is the center of a circle and TK is a tangent to the circle. TK is 20cm and OK = 30cm. Determine the length of the radius OT. Give the answer to the nearest tenth. Point T is the point of tangency.



<OTK = 90° (Tang P)

OT ⇒ Leg

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

$a^2=30^2- 20^2$

$a^2=900 - 400$

$a^2=500$

$a = \sqrt{500}$

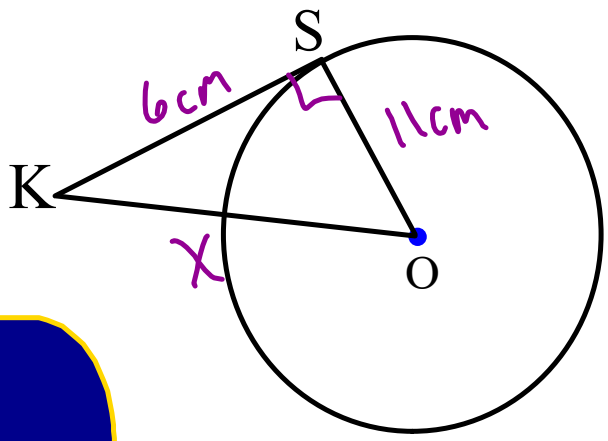
$a = 22.4$ cm

Section 8.1 Warm Up

SK is a tangent determine the length of KO if given the following:
SO is 11cm and KS is 6 cm

Point S is the point of tangency.

SHOW ALL WORK AND COPY THIS DOWN



<OSK = 90° (Tang P)

KO ⇒ Hyp

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

$c^2=11^2 + 6^2$

$c^2=121 + 36$

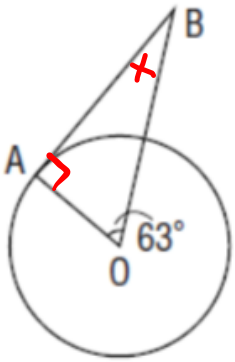
$c^2=157$

$c = \sqrt{157}$

$c = 12.5$ cm

Solving Problems Using the Tangent and Radius Property

Point O is the centre of a circle and AB is a tangent to the circle.
In ΔOAB, $\angle AOB = 63°$
Determine the measure of $\angle OBA$.
Point A is the point of tangency.



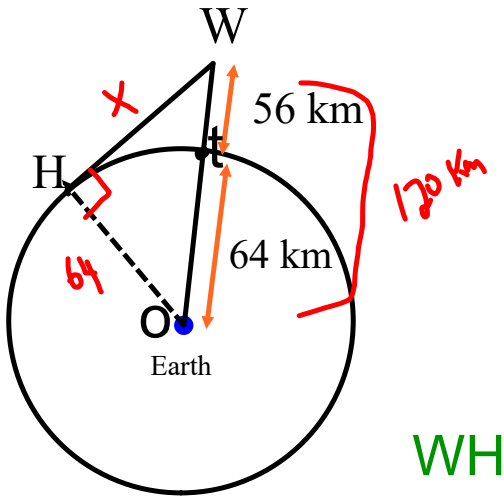
<OAB = 90° (Tang P)

<OBA = 180° - 90° - 63°

<OBA = 27° (SATT)

Solving Problems Using the Tangent and Radius Property

An airplane, W, is cruising at an altitude of 56km. A cross section of Earth is a circle with radius approximately 64 km. A passenger wonders how far she is from a point H on the horizon she sees outside the window. Calculate this distance to the nearest kilometre.



Must draw OH

<OHW = 90° (Tang P)

OH = OT = 64km (radii)

WH ⇒ Leg

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

$a^2=120^2- 64^2$

$a^2=144\ 00 - 4096$

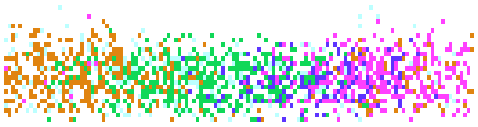
$a^2=2696$

$a = \sqrt{2696}$

$a = 51.9$ km

52km

Class/Homework



-click on the "Homework" link on my teachers page for optional review questions

- If you have any questions you can contact me on the

Remind app

or

through email:

melanie.burns@nbed.nb.ca

Attachments

Section 8.1 Sticky Note Activity.docx