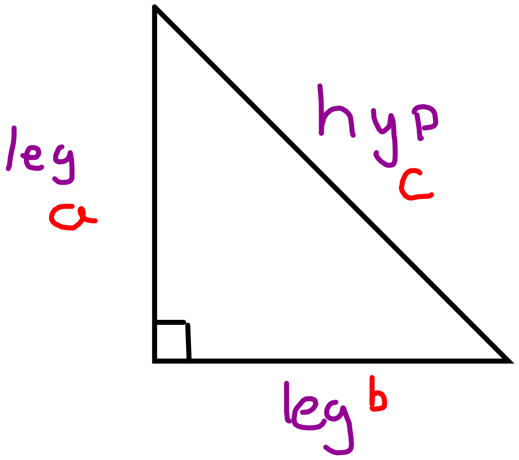
Curriculum Outcomes:

(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)

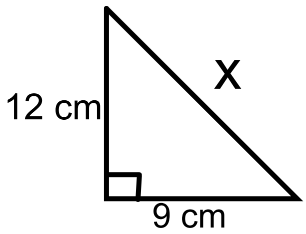
Pythagorean Theorem Review



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

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

1)



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

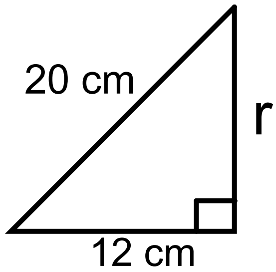
$c^2 = 12^2 + 9^2$

$c^2 = 144 + 81$

$\sqrt{c^2} = \sqrt{225}$

$c = 15$

2)



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

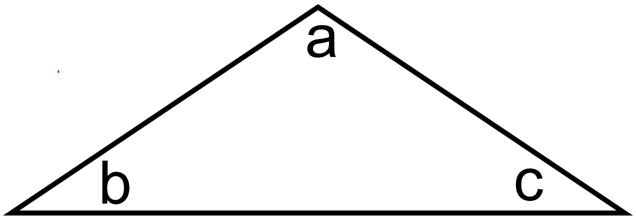
$a^2 = 20^2 - 12^2$

$a^2 = 400 - 144$

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

$a = 16$

Missing angles:



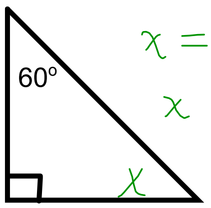
$a + b + c = 180^\circ$ (SATT)

sum angle triangle theorem

or

($\angle$ sum $\triangle$)

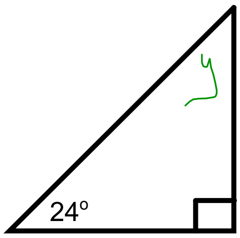
1)



$x = 180 - 60 - 90$

$x = 30^\circ$ (SATT)

2)

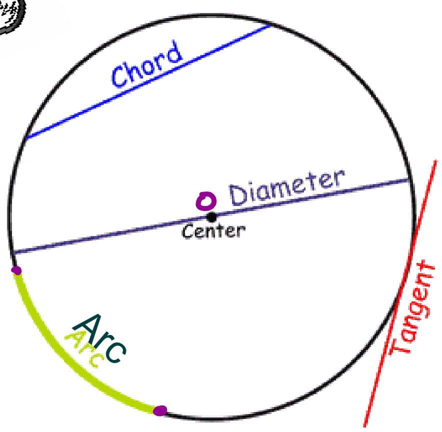


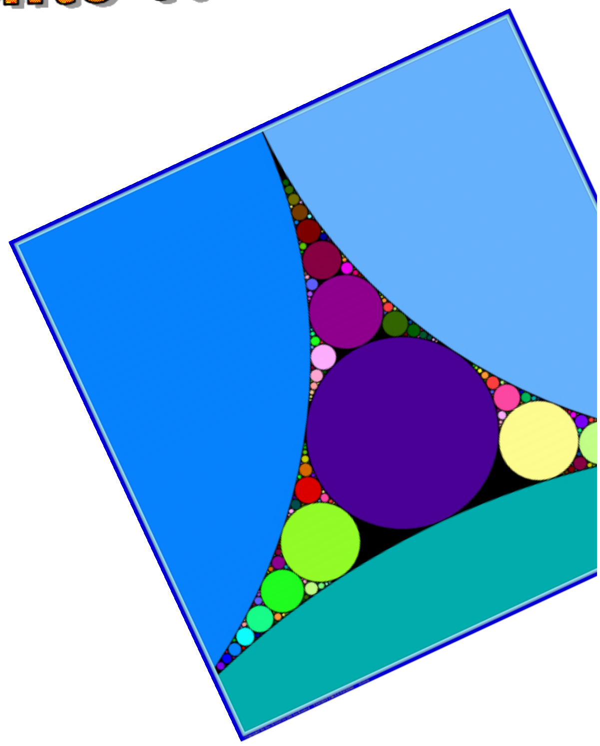
$y = 180 - 90 - 24$

$y = 66^\circ$ (SATT)

Section 8.1

Properties of Tangents to a Circle

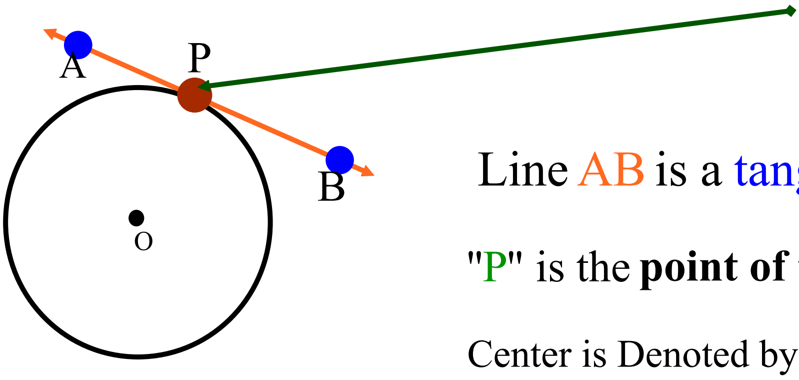




Tangent Properties

- **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

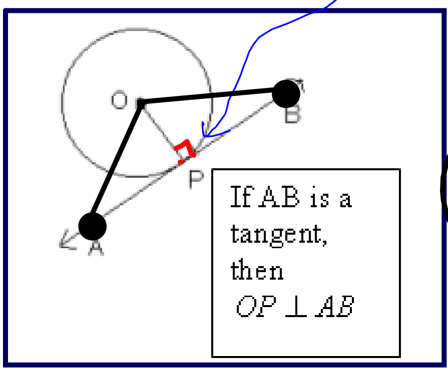
"P" is the **point of tangency**

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 = 90° (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)

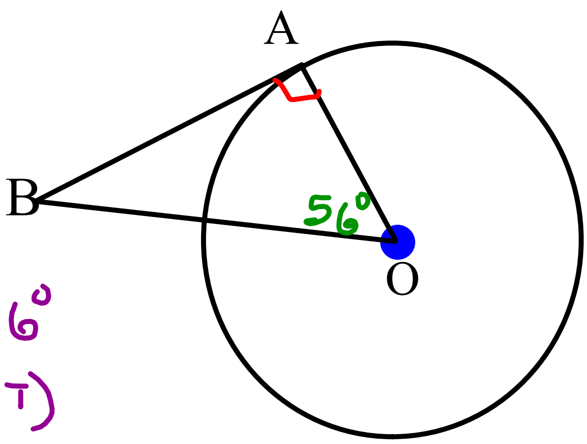
Determining the Measure of an Angle in a Triangle

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)

<BAO = 90° (Tang P)

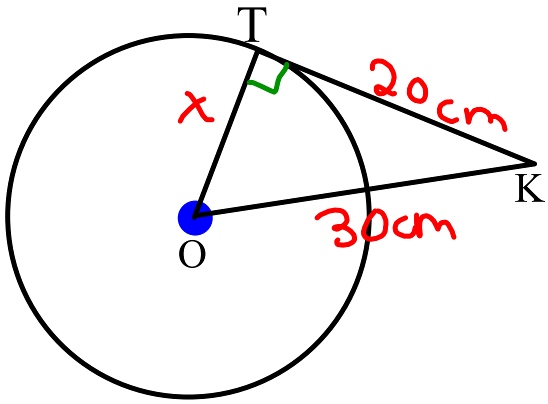
<OBA = 180 − 90 − 56°
= 34° (SATT)



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.

(Show all Work)



$\angle OTK = 90^\circ$ (Tang ⊥)

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

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

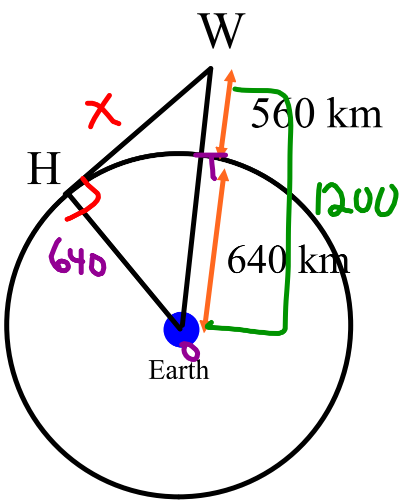
$a^2 = 900 - 400$

$\sqrt{a^2} = \sqrt{500}$

$a = 22.4$ cm

Solving Problems Using the Tangent and Radius Property

An airplane, W, is cruising at an altitude of 560km. A cross section of Earth is a circle with radius approximately 640 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.



$\angle WHO = 90^\circ$ (Tang P)

WH→leg

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

$a^2 = 1200^2 - 640^2$

$a^2 = 1440000 - 409600$

$\sqrt{a^2} = \sqrt{1030400}$

$a = 1015.1$ Km

Wrap Up to Tangents

$\angle$ ___ $= 90^\circ$ (Tang P)

Only two ways to solve Tangent Problems:

1) Angle sum of a triangle

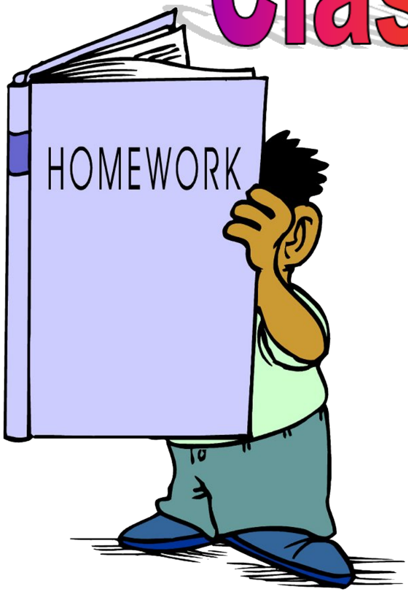
$180^\circ - 90^\circ -$ given angle = unknown angle

2) Pythagorean Theorem

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

$a = \sqrt{c^2 - b^2}$ Leg

Class/Homework



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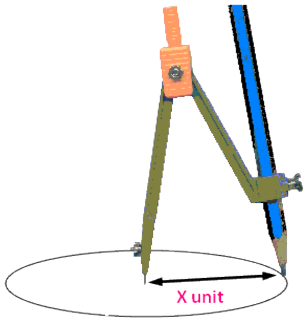
Day 1

3 ab
4a
sketch

~~5abc sketch~~
~~6abc sketch~~
~~7ab sketch~~



Attachments

Section 8.1 Sticky Note Activity.docx