MAY 1, 2019

UNIT 8: CIRCLE GEOMETRY

8.1: PROPERTIES OF TANGENTS TO A CIRCLE

K. Sears
MATH 9

WHAT'S THE POINT OF TODAY'S LESSON?

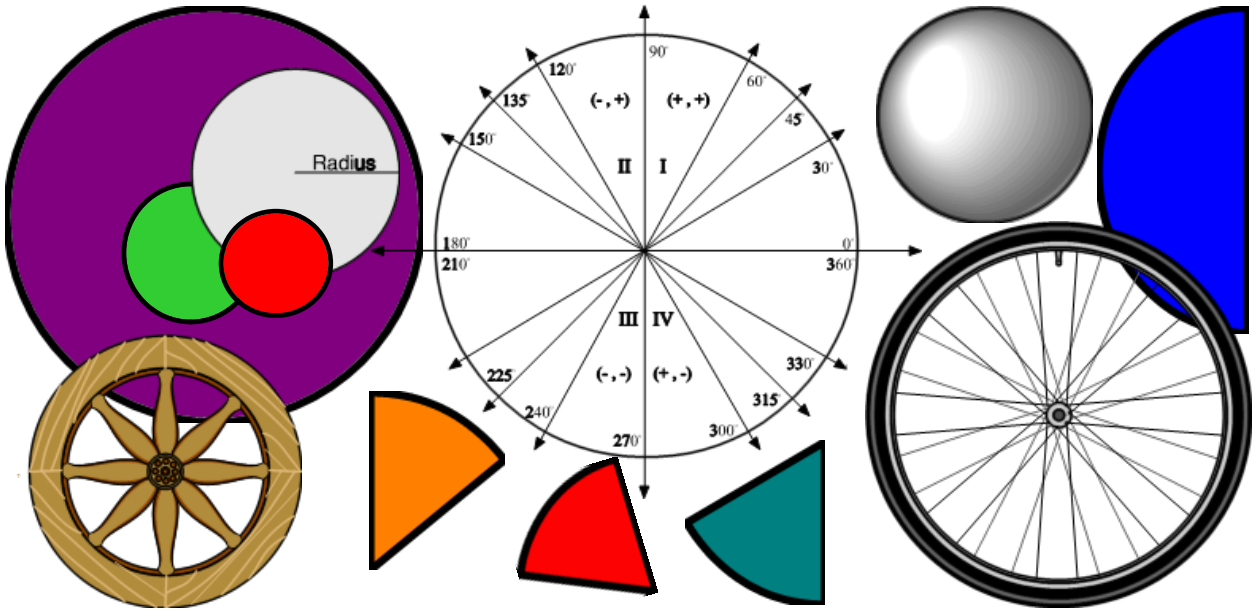
We will begin working on the Math 9 Specific Curriculum Outcome (SCO) "Shape and Space 1" OR "SS1" which states:

"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."**

Please turn to page 382 in *MMS9*

("What You'll Learn" and "Why It's Important".

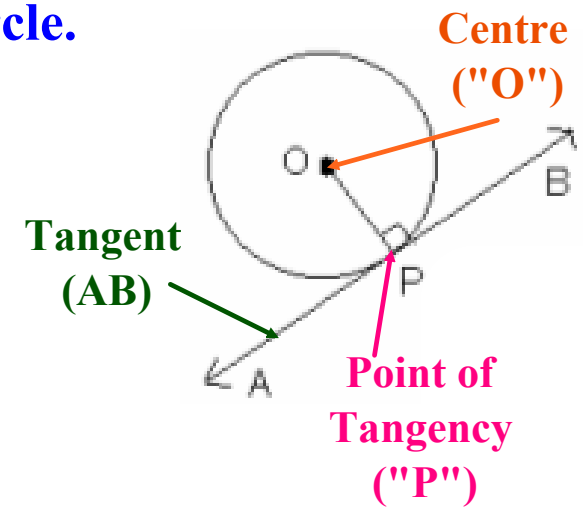


VOCABULARY:

1. **TANGENT**: A line that intersects a circle at only one point.
2. **POINT OF TANGENCY**: The point where the tangent intersects the circle.

(Please turn to *MMS9*, page 385 for a moment.)

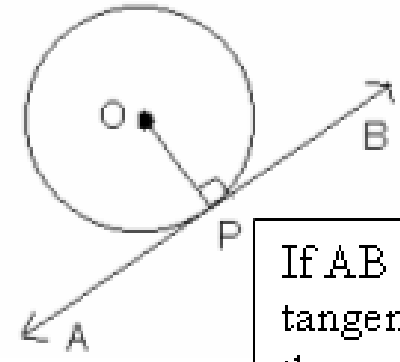
T



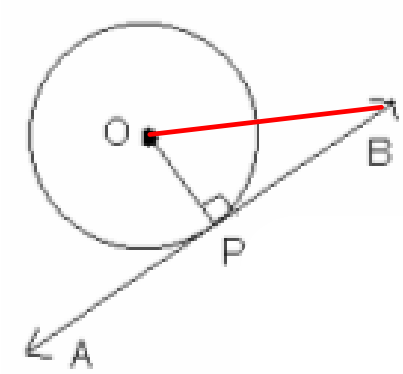
VOCABULARY:

3. TANGENT-RADIUS PROPERTY (TRP): A tangent to a circle is perpendicular to the radius at the point of tangency.

<APO = <BPO = 90°



If AB is a tangent, then $OP \perp AB$



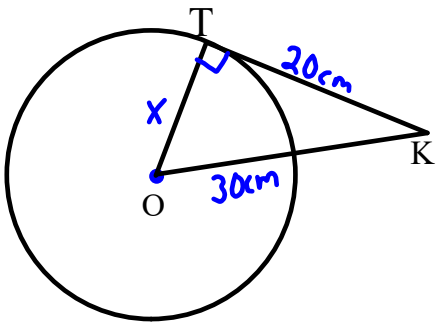
By joining "O" with "B", a right triangle is formed. What theorem could you use to find a missing side length here?

THE PYTHAGOREAN THEOREM!!!

Using the Pythagorean Theorem in a Circle

Point O is the centre of a circle, and KT is a tangent to the circle. KT measures 20 cm, and KO measures 30 cm. Determine the length of the radius, OT, to the nearesttenth.

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



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

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

$x^2 = 30^2 - 20^2$

$= 900 - 400$

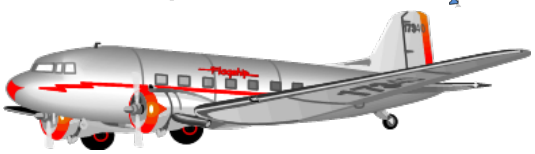
$= 500$

Answer:

$x = \sqrt{500}$

$= 22.4$ cm

Solving Problems Using the Tangent and Radius Property



An airplane, W, is cruising at an altitude of 5600 m. A cross section of Earth is a circle with radius approximately 6400 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.

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

$x^2 = 6405.6^2 - 6400^2$

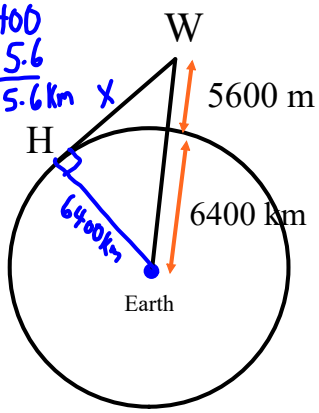
$= 41\,031\,711.36 - 40\,960\,000$

$= 71\,711.36$

$x = \sqrt{71\,711.36}$

$= 268$ km

6400
+ 5.6
6405.6 km



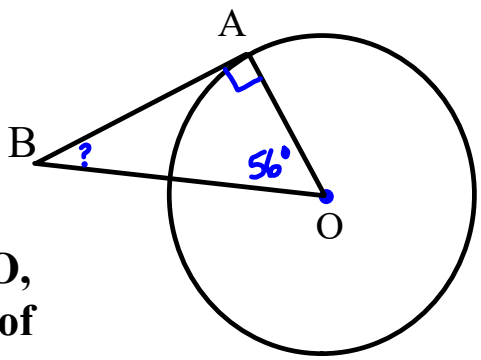
ANSWER: 268 km

Determining the Measure of an Angle in a Triangle

REMEMBER: "SATT" (the sum of the angles in a triangle theorem) - the sum of the three angles in any triangle is ALWAYS 180°

Point O is the centre of a circle, and AB is a tangent to the circle. In ΔABO, <AOB = 56°. Determine the measure of <ABO.

ANSWER: 34°



∠BAO = 90° TRP
∠AOB = 56° Given

∠ABO = 180 - 90 - 56 SATT
= 34°

CONCEPT REINFORCEMENT:

***MMS9*:**

PAGE 388: #3, #5 & #6
PAGE 389: #7, #9, #11 & #12
PAGE 390: #13, #14, #17 & #18
PAGE 391: #19, #20 & #22

Attachments

Section 8.1 Sticky Note Activity.docx