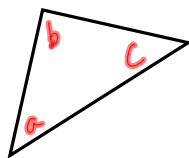


Recall,

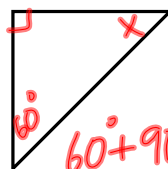
\* here are two ways to find unknown measures  
in triangles:

① Angles

$$a^\circ + b^\circ + c^\circ = 180^\circ$$



ex:

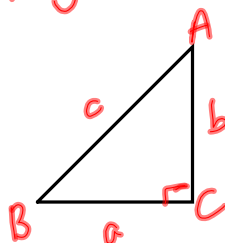


$$60^\circ + 90^\circ + x^\circ = 180^\circ$$

$$180 - 60 - 90 = x$$

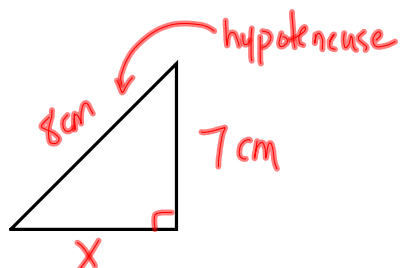
$$30^\circ = x$$

② Pythagorean theorem



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

ex:



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

$$7^2 + x^2 = 8^2$$

$$49 + x^2 = 64$$

$$x^2 = 64 - 49$$

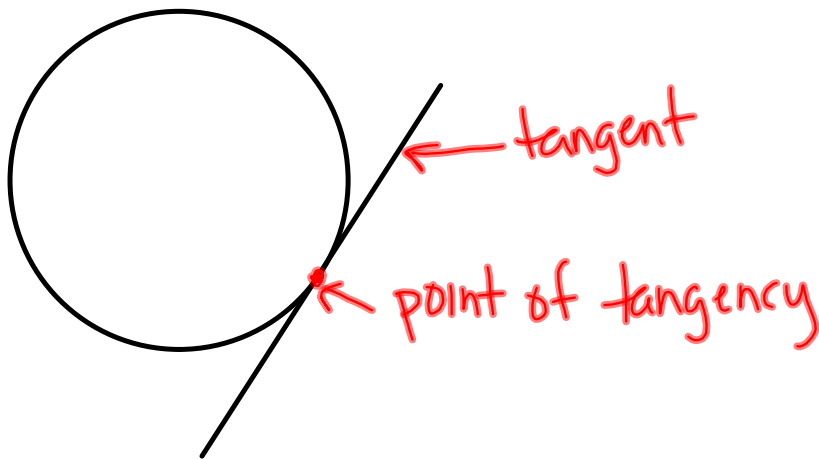
$$x^2 = 15$$

$$x = \sqrt{15}$$

$$x = 3.9 \text{ cm}$$

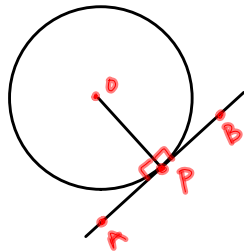
## Chapter 8 - Circle Geometry

### Sec 8.1 - Properties of tangents to a circle



tangent = is a line that intersects a circle at only one point

point of tangency = is the point where the tangent intersects the circle.

\* tangent-radius property

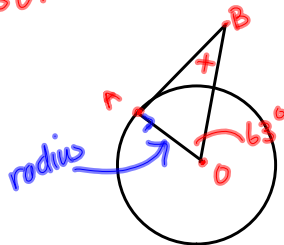
a tangent to a circle is perpendicular to the radius at the point of tangency.

That is  $\angle APO = \angle BPO = 90^\circ$

\* perpendicular means lines meet at a  $90^\circ$  angle. The symbol is  $\perp$ .

Ⓐ Determining the measure of an angle in a triangle

Example: AB is tangent and point O is the center of the circle. Find the measure of angle ABO.



Solution:  $X^\circ = \angle ABO$

Since AB is tangent to the circle  
 $\angle OAB = 90^\circ$ .

The sum of  $\angle$ 's in  $\triangle$  is  $180^\circ$ .

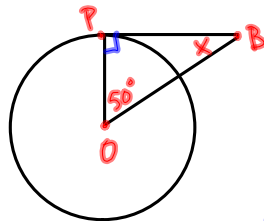
therefore.  $X^\circ + 63^\circ + 90^\circ = 180^\circ$

$$X^\circ = 180^\circ - 153^\circ$$

$$X = 27^\circ$$

Example Q: Find the measure of an angle.

BP is tangent to the circle at P; O is the center of the circle. Find the measure of  $x^\circ$ .



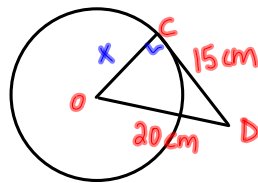
Solution:

$$180 - 140 = 40^\circ$$

$$\text{Therefore } x = 40^\circ.$$

B Using the pythagorean theorem in a circle

Example @: O is the center and CD is tangent to the circle. Find the length of the radius OC and then diameter of the circle.



Solution: Since CD is tangent,  $\angle OCD = 90^\circ$ .

\* Use the pythagorean theorem

$$\text{let } OC = x$$

$$x^2 + 15^2 = 20^2$$

$$x^2 + 225 = 400$$

$$x^2 = 400 - 225$$

$$x^2 = 175$$

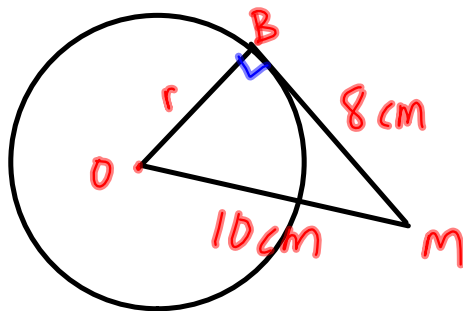
$$x = \sqrt{175}$$

$$x = 13.23$$

the radius of the circle is about 13.2 cm long.

diameter is  $2(13.2) = 26.4$  cm.

Example 2: MB is tangent to the circle at B. O is the center. Find the length of radius DB.



Solution:  $\angle OBM = 90^\circ$

$$r^2 + 8^2 = 10^2$$

$$r^2 + 64 = 100$$

$$r^2 = 100 - 64$$

$$r^2 = 36$$

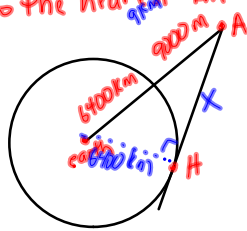
$$r = \sqrt{36}$$

$$r = 6$$

So, the radius is 6 cm.

## © Solving Problems Using the Tangent and Radius Property

Example: An airplane, A is cruising at an altitude of 9000m. 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 the distance to the nearest km.



Solution: \* need to find AH, let that be X

AH is tangent therefore  $\angle H = 90^\circ$ .  
 earth to H is also 6400 km because it is a radius.  
 \* now we can use the pythagorean theorem.

note: 9000m = 9 km

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

$$X^2 + 6400^2 = 9000^2$$

$$X^2 + 40960000 = 41075281$$

$$X^2 = 41075281 - 40960000$$

$$X^2 = 115281$$

$$X = \sqrt{115281}$$

$$X = 339.53$$

$$X \approx 340 \text{ km.}$$

The passenger is about 340 km away from the horizon

Pg. 388 #'s 3-9, 12, 13.