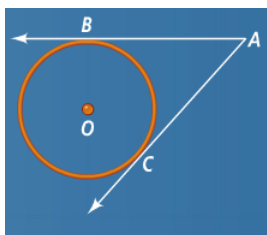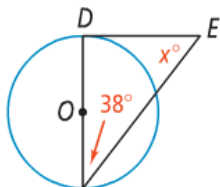## Lesson 12.1 Tangent lines

A <u>tangent to a circle</u> is a line in the plane of the circle that intersects the circle in exactly one point.

That point is called the <u>point of tangency</u>. Ray AB is tangent to circle O at B. Ray AC is tangent at point C.

Theorem 12-1

Theorem	If . . .	Then . . .
If a line is tangent to a circle, then the line is perpendicular to the radius at the point of tangency.	$\overleftrightarrow{AB}$ is tangent to $\odot O$ at P	$\overleftrightarrow{AB} \perp \overline{OP}$

Ex. Segment ML and MN are tangent to circle O. What is x?

1 Segment ED is tangent to circle O at D. What is the value of x?

Earth Science The CN Tower in Toronto, Canada, has an observation deck 447 m above ground level. About how far is it from the observation deck to the horizon? Earth's radius is about 6400 km.
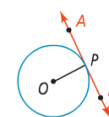
Ex. What is the distance to the horizon that a person can see on a clear day from an airplane 2 mi above Earth? Earth's radius is about 4000 mi.

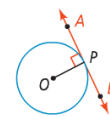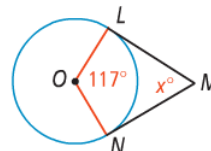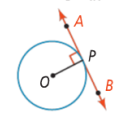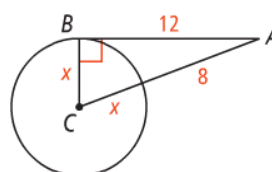**Theorem 12-2**

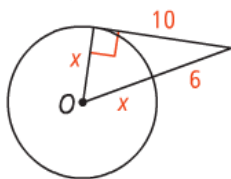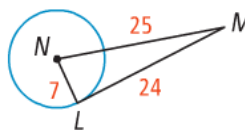| Theorem	If . . .	Then . . .
If a line in the plane of a circle is perpendicular to a radius at its endpoint on the circle, then the line is tangent to the circle.	$\overleftrightarrow{AB} \perp \overline{OP}$ at P	$\overleftrightarrow{AB}$ is tangent to $\odot O$

Ex. What is the radius of circle C?

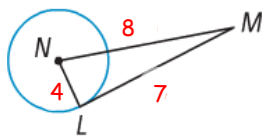2 What is the radius of circle O? Round to the nearest tenth.

10

x

6

O   x

Ex. Is segment ML tangent to circle N at L? Explain.

N   25   M

7   24

L

---

3 Is segment ML tangent to circle N at L?

Yes

No

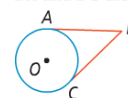N   8   M

4   7

L

Theorem 12-3

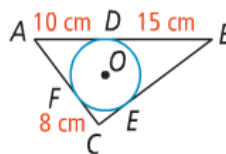| Theorem	If ...	Then ...
If two tangent segments to a circle share a common endpoint outside the circle, then the two segments are congruent.	$\overline{BA}$ and $\overline{BC}$ are tangent to $\odot O$ A B O C	$\overline{BA} \cong \overline{BC}$

Ex. Circle O is inscribed in triangle ABC. What ist he perimeter of triangle ABC?

A 10 cm D 15 cm B

F   •O

8 cm   E

C

---

4 Circle O is inscribed in triangle PQR, which has a perimeter of 88 cm. What is the length of segment QY?

Q

15 cm   X

P   Y

•O

Z

17 cm

R