Geometry

12.1 Tangent Lines

A tangent to a circle is

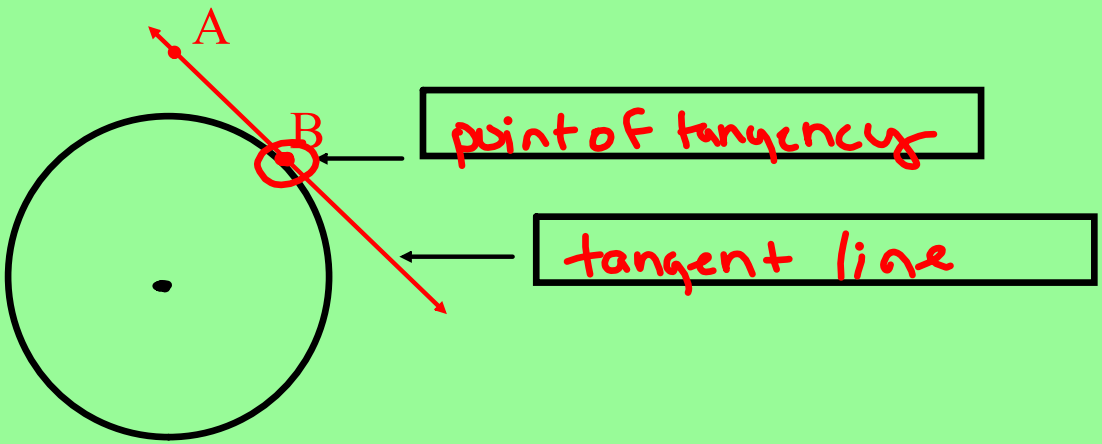
Pull

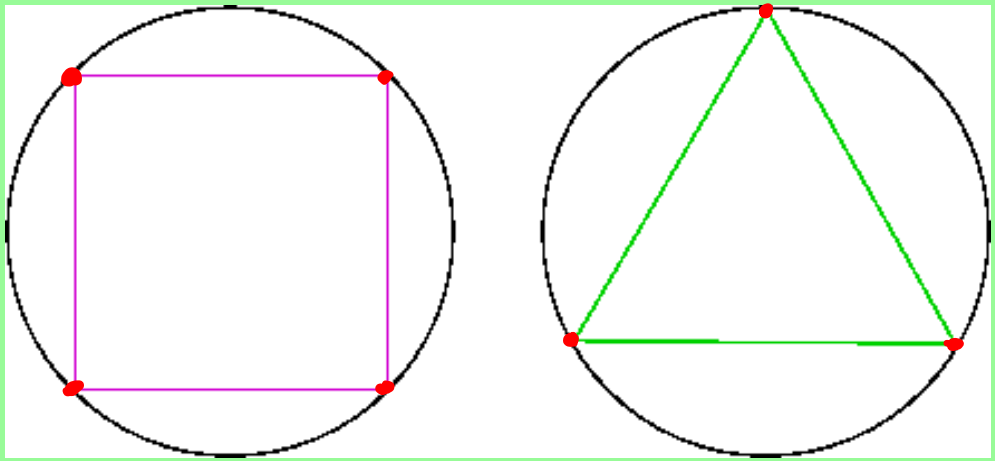
a line, segment, or ray in the plane of the circle that intersects the circle in exactly one point.

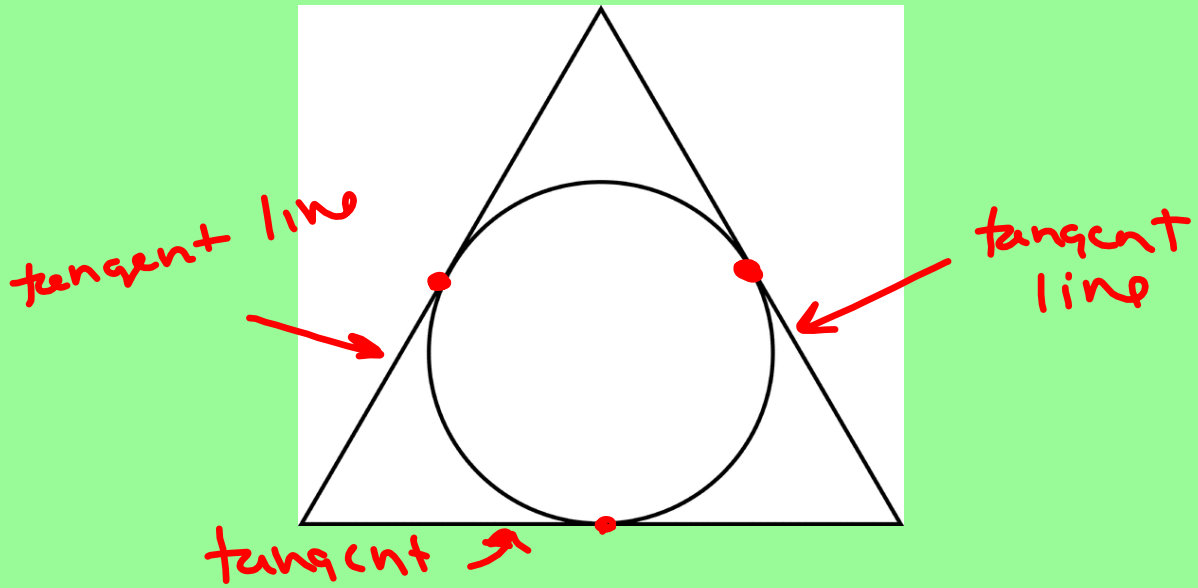
The point of tangency is

Pull

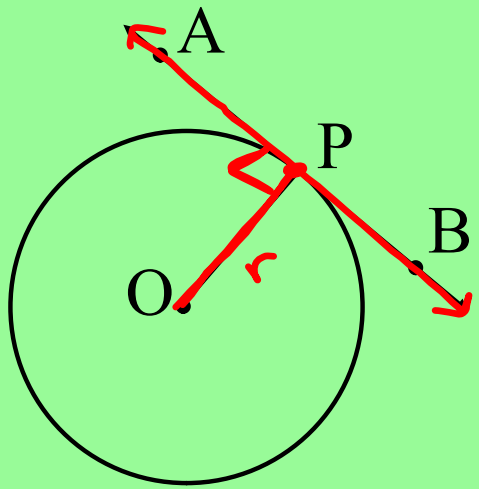
the point where the circle and a tangent intersect.





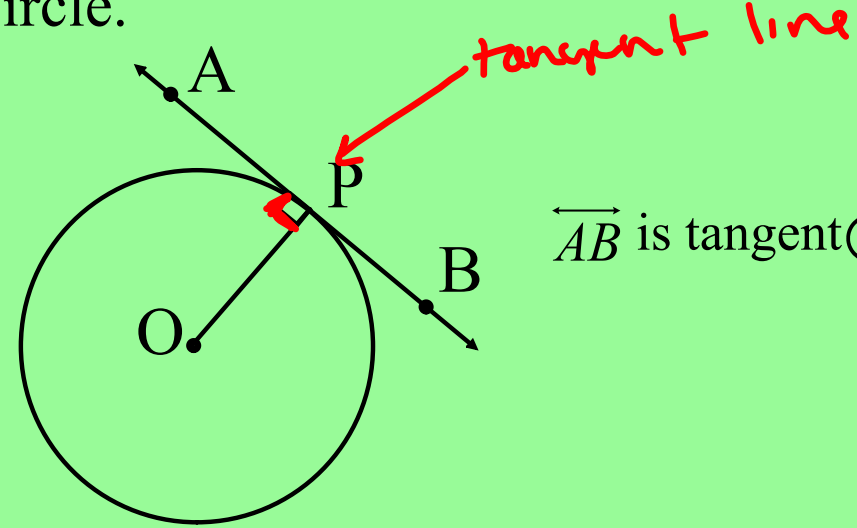

tangent line
tangent line
tangent

Theorem 12.1 -- If a line is tangent to a circle, then the line is perpendicular to the radius drawn to the point of tangency.



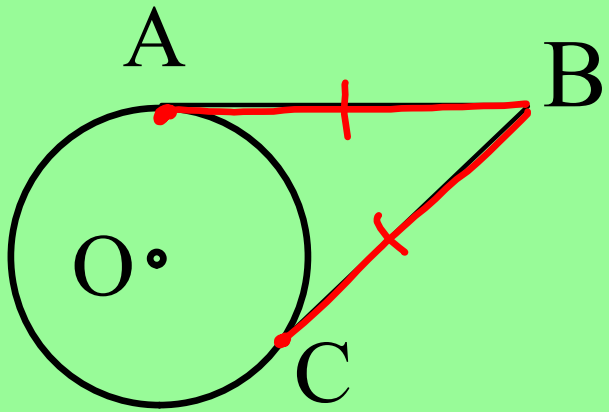
$\overleftrightarrow{AB} \perp \overline{OP}$

Theorem 12-2 -- 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.



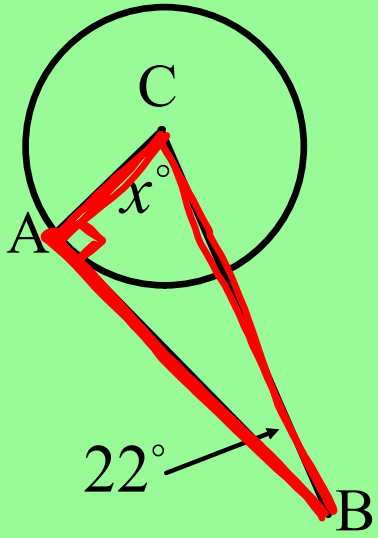
$\overleftrightarrow{AB}$ is tangent $\odot O$.

Theorem 12.3 -- The two segments tangent to a circle from a point outside the circle are congruent.



$$\overline{AB} \cong \overline{CB}$$

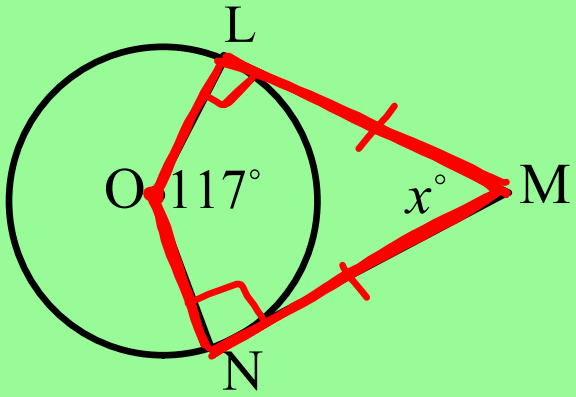
$\overline{BA}$ is tangent circle C at point A. Find the value of x.



90
-22

X = 68°

$\overline{ML}$ and $\overline{MN}$ are tangent to circle O. Find the value of x.

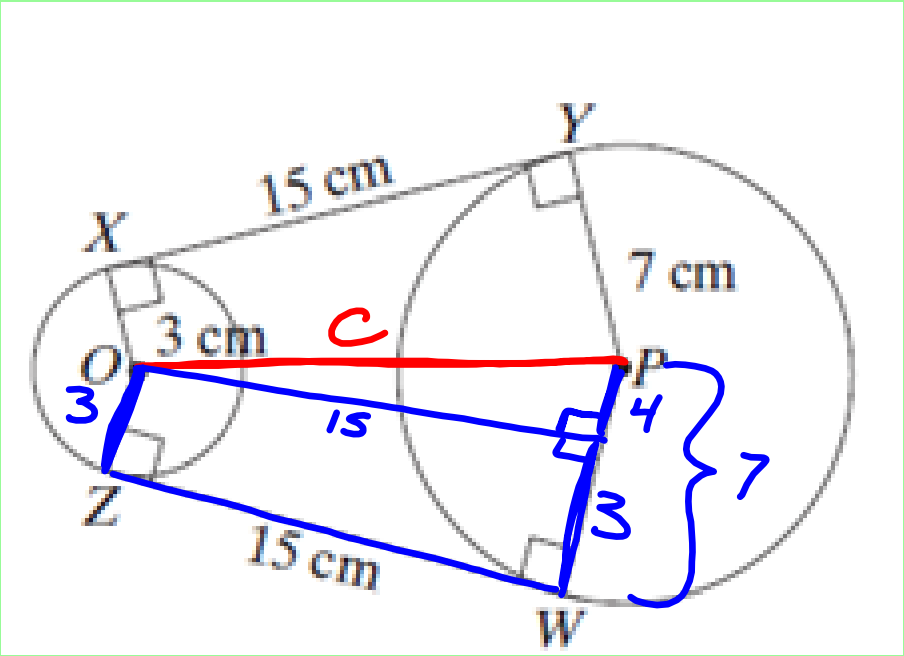


$$\begin{array}{r} 117 \\ +\ 90 \\ +\ 90 \\ \hline 297 \end{array}$$

$$\begin{array}{r} {}^{1}\cancel{3}{}^{5}\cancel{6}{}^{1}0 \\ -\ 297 \\ \hline 63 \end{array}$$

$x = 63^{\circ}$

A belt fits tightly around two circular pulleys, as shown. Find the distance between the centers of the pulleys. Round your answer to the nearest tenth.



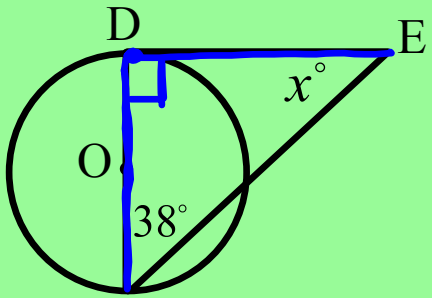
$15^2 + 4^2 = c^2$

$225 + 16 = c^2$

$\sqrt{c^2} = \sqrt{241}$

$c \approx 15.5$ cm

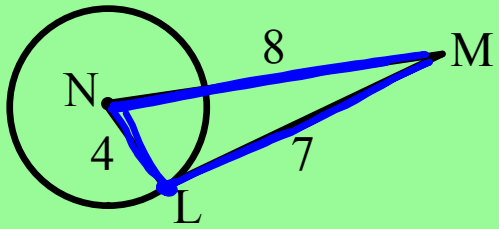
$\overline{ED}$ is tangent to circle O. Find the value of x.



90
−38
52

X = 52°

Is $\overline{ML}$ tangent to circle N at L? Explain.



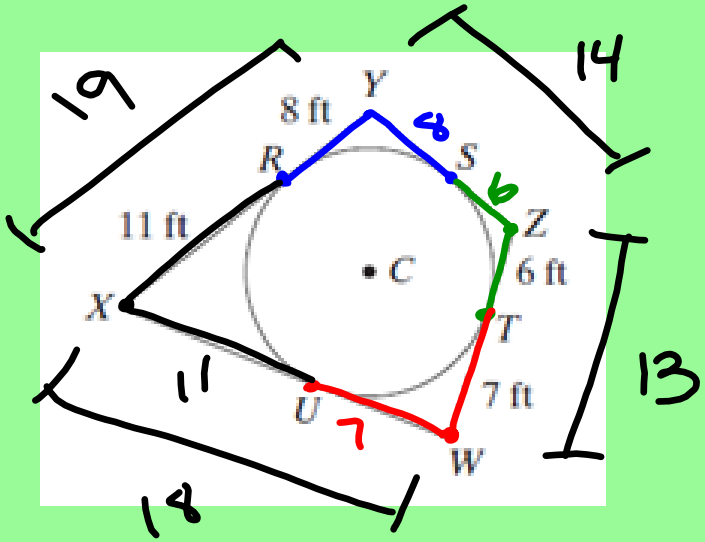
$4^2 + 7^2 = 8^2$

$16 + 49 = 64$

$65 \neq 64$

No, $\overline{ML}$ is not tangent $\odot N$ because it is not a Rt $\triangle$

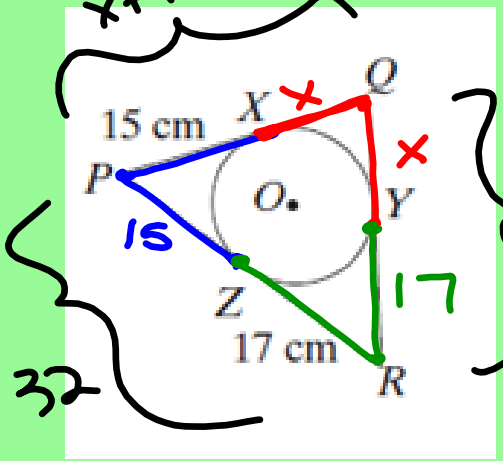
Circle C is inscribed in quadrilateral XYZW. Find the perimeter of XYZW.



$P = 19 + 14 + 13 + 18$

$P = 64$ ft

Circle O is inscribed ΔPQR has a perimeter of 88 cm. Find QY.



$P = 88$

$x+17+32+x+15=88$

$2x+64=88$

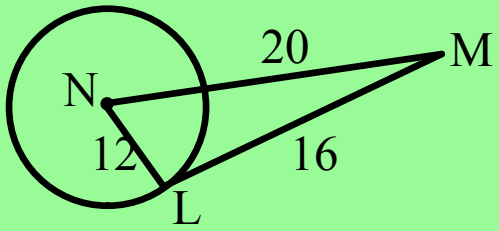
$-64 \quad -64$

$2x=24$

$x=12$

$QY = 12$ cm

Is $\overline{ML}$ tangent to circle N at L? Explain.



$12^2 + 16^2 = 20^2$

$144 + 256 = 400$

$400 = 400$