9.1 Tangent Properties

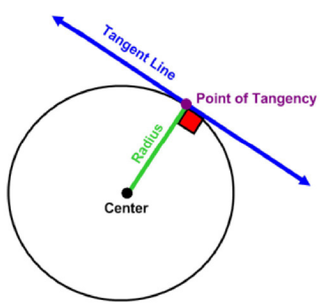
a. I can determine and apply the relationship between a radius and a tangent line at the point of tangency.

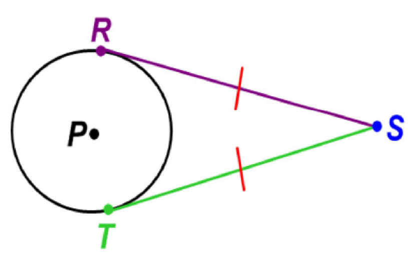
b. I can determine and apply the relationship between two tangent segments with a common endpoint outside the circle.

Recall from yesterday:

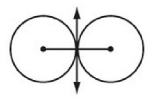
Tangent Conjecture: A tangent to a circle is perpendicular to the radius drawn to the point of tangency.

Tangent Segments Conjecture: Tangent segments to a circle from a point outside the circle are congruent.

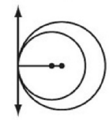




Tangent circles are two circles that are tangent to the same line at the same point. They can be **internally tangent** or **externally tangent**, as shown. What conjectures can you make about tangent circles? You will explore more about them in the exercise set.



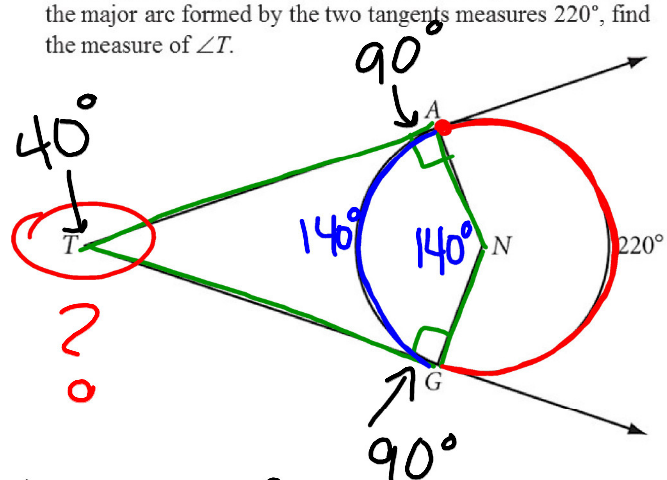
Externally tangent circles



Internally tangent circles

EXAMPLE

In the figure at right, $\overrightarrow{TA}$ and $\overrightarrow{TG}$ are both tangent to circle N. If the major arc formed by the two tangents measures 220°, find the measure of $\angle T$.

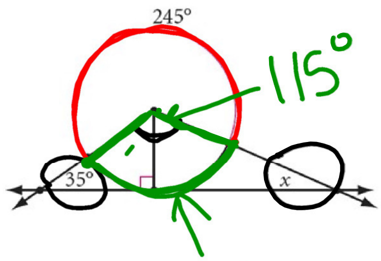


$m\angle T = 40°$

$360 - 90 - 90 - 140$

Extra Example

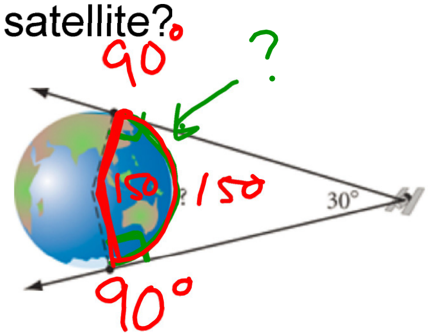
Find x.



$180 - 115 - 35$

$\boxed{x = 30°}$

A satellite in geostationary orbit remains above the same point on Earth's surface even as Earth turns. If such a satellite has a 30° view of the equator, what percentage of the equator is observable from the satellite?

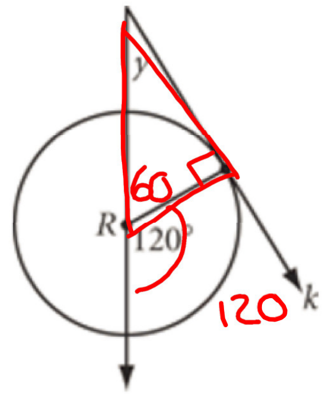


$\frac{150}{360} = 41.7\%$

$360 - 90 - 90 - 30$

$= 150°$

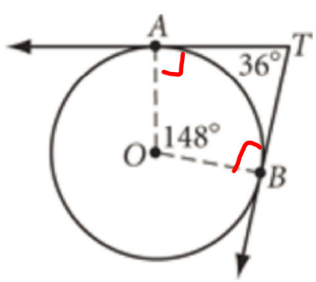
4. Ray k is tangent to circle R. Find y.



$y = 180 - 60 - 90$

$\boxed{y = 30^\circ}$

5. $\overrightarrow{TA}$ and $\overrightarrow{TB}$ are tangent to circle O. What's wrong with this picture?



The interior angles of the Quad add to 364°. Should add to 360°