

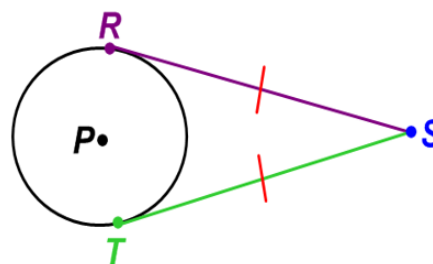
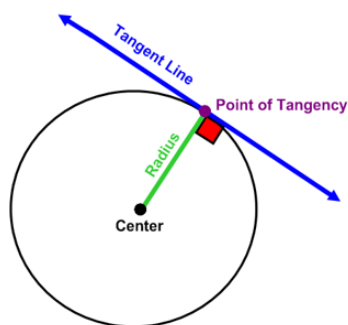
## 9.1 Tangent Properties

- I can determine and apply the relationship between a radius and a tangent line at the point of tangency.
- I can determine and apply the relationship between two tangent segments with a common endpoint outside the circle.

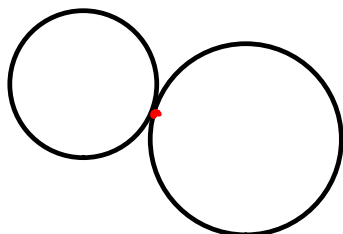
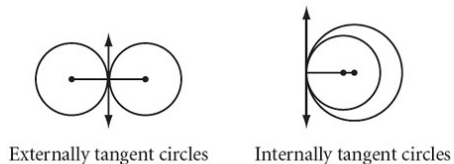
Recall from yesterday:

**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.

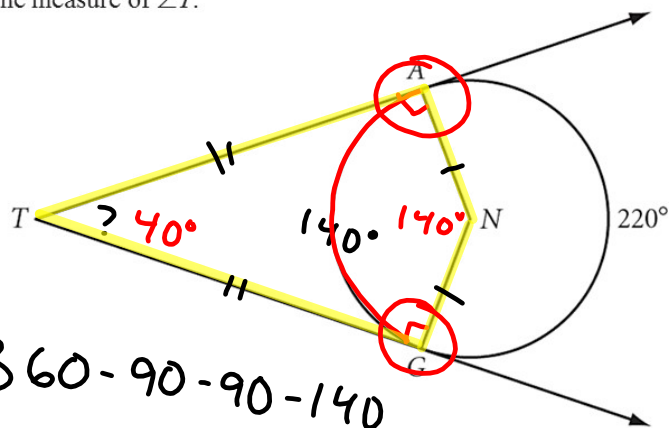


**Tangent circles** are two circles that are tangent to the same line at the same point. They can be **internally tangent** or **externally tangent**, as shown. What conjectures can you make about tangent circles? You will explore more about them in the exercise set.



**EXAMPLE**

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

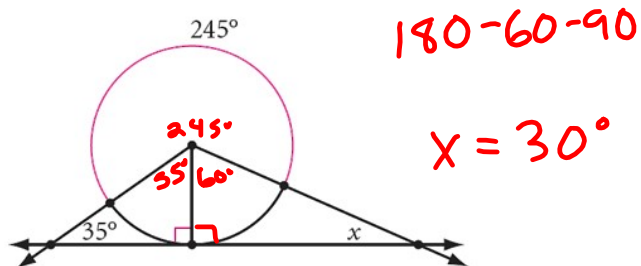


$$m\angle T = 360 - 90 - 90 - 140$$

$$m\angle T = 40^\circ$$

### Extra Example

Find  $x$ .



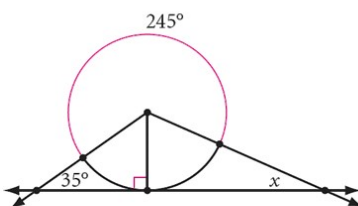
## Tangent Properties

### Extra Example

ANSWER

Find  $x$ .

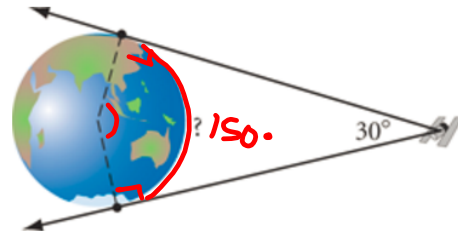
$x = 30^\circ$



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

$$360 - 90 - 90 - 30$$

$$\% = \frac{150}{360} \approx .41\bar{6}$$

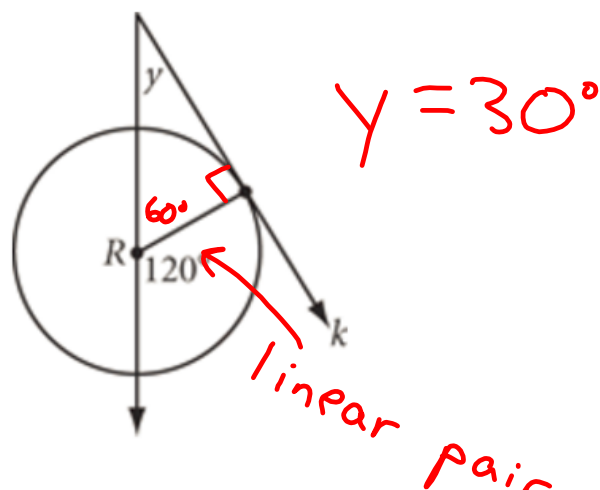


About 42%.

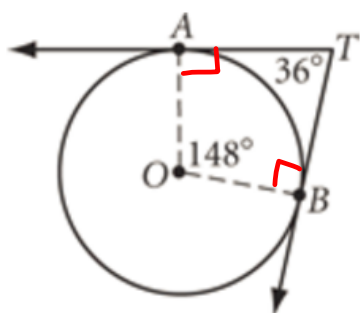
A satellite in geostationary orbit remains above the same point on Earth's surface even as Earth turns. If such a satellite has a  $30^\circ$  view of the equator, what percentage of the equator is observable from the satellite? [h](#)

$$360^\circ - 30^\circ - 90^\circ - 90^\circ = 150^\circ \text{ and } \frac{150^\circ}{360^\circ} = 41.\bar{6}\%$$

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



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



Angles should add to  $360^\circ$ , not  $364^\circ$ .