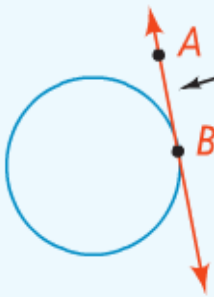
Geometry

Chapter 12

Section 12-1



A **tangent to a circle** is a line in the plane of the circle that intersects the circle in exactly one point.

The point where a circle and a tangent intersect is the **point of tangency.**

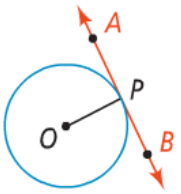
$\overrightarrow{BA}$ is a tangent ray and $\overline{BA}$ is a tangent segment.

take note

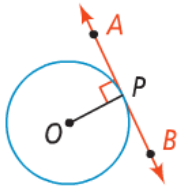
Theorem 12-1

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

If . . .
$\overleftrightarrow{AB}$ is tangent to $\odot O$ at P



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

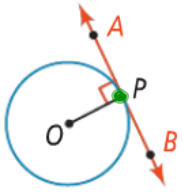


take note

Theorem 12-2

Theorem
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.

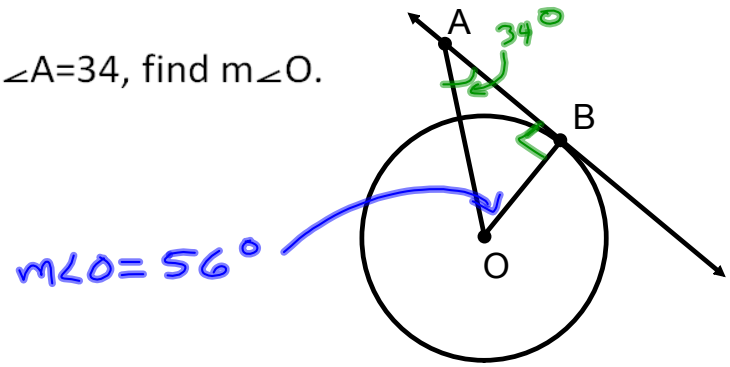
If . . .
$\overleftrightarrow{AB} \perp \overline{OP}$ at P



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

P is point of tangency

$\overleftrightarrow{AB}$ is tangent to $\odot O$. If m∠A=34, find m∠O.



m∠O = 56°

$\overline{AO} = 10.1$, $\overline{AB} = 6.06$. Find $\overline{OB}$.

$10.1^2 - 6.06^2 = OB^2$

$8.08 = OB$

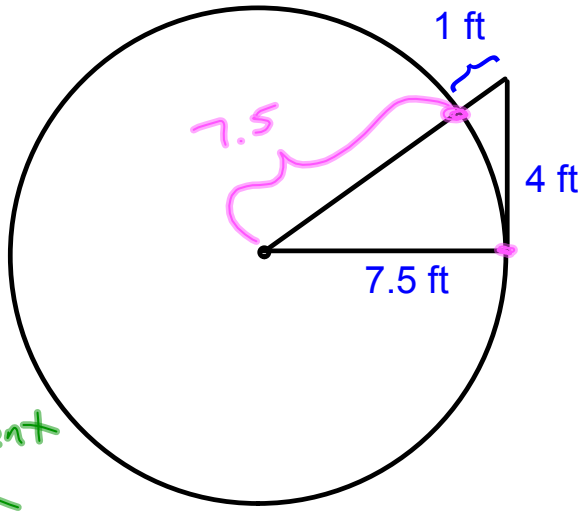
Determine whether a tangent is shown in the diagram.

$a^2 + b^2 \stackrel{?}{=} c^2$

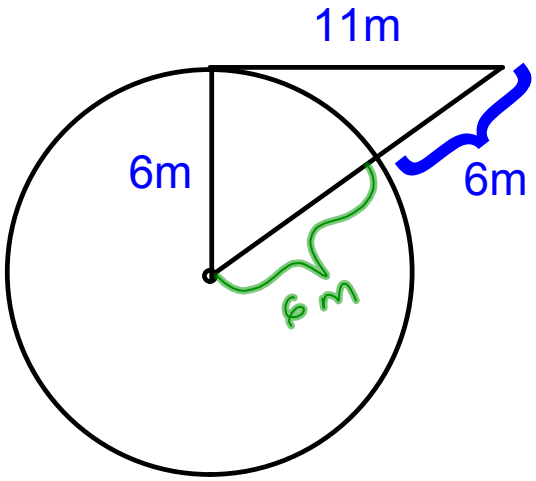
$4^2 + 7.5^2 \stackrel{?}{=} 8.5^2$

$72.25 = 72.25$

Yes, 4ft segment is tangent



Determine whether a tangent is shown in the diagram.



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

$6^2+11^2 \stackrel{?}{=} 12^2$

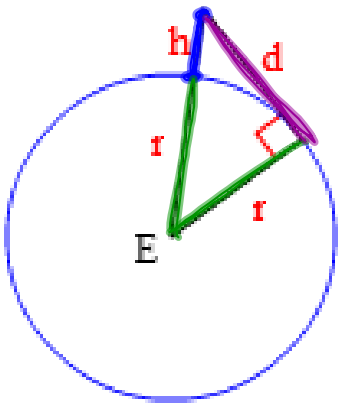
$36+121 \stackrel{?}{=} 144$

$157 \neq 144$

No, tangent

The diagram at right shows the distance to the horizon from a given height. Circle E represents the earth which has a radius of about 6400 km.

To the nearest km, what is the approximate distance to the horizon from a person at a height of 160 km?



$r=6400$

$h=160$

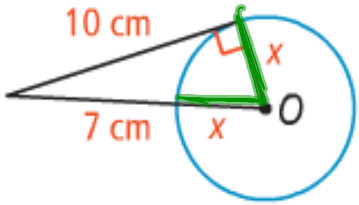
$(h+r)^2=d^2+r^2$

$(h+r)^2-r^2=d^2$

$6560^2-6400^2=d^2$

$1440\text{km}=d$

In the circle, what is the value of x, to the nearest tenth?



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

$10^2+x^2=(7+x)^2$

$10^2+x^2=(7+x)(7+x)$

$10^2+x^2=49+7x+7x+x^2$

$-x^2 \quad -x^2$

$100=49+14x$

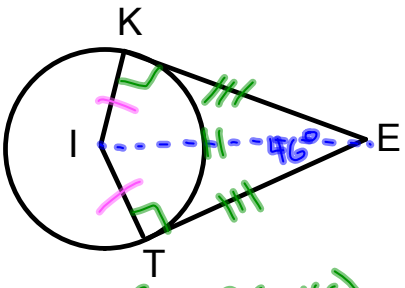
$-49 \quad -49$

$\frac{51}{14}=\frac{14x}{14}$

$\frac{51}{14}\text{cm}=x$

$\overline{KE}$ and $\overline{TE}$ are tangent to $\odot I$.

If $m\angle E=46$, find $m\angle I$.



$(n-2)180=360$

$360-(90+90+46)$

$m\angle I=134$

What kind of shape is $\square$KITE?

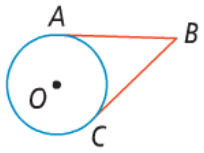
KITE

take note

Theorem 12-3

Theorem
If two tangent segments to a circle share a common endpoint outside the circle, then the two segments are congruent.

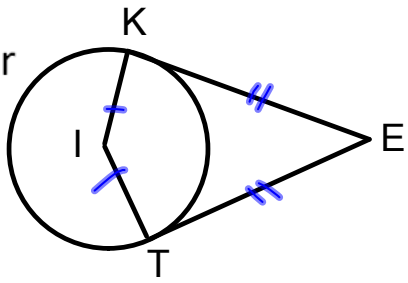
If . . .
$\overline{BA}$ and $\overline{BC}$ are tangent to $\odot O$



Then . . .
$\overline{BA} \cong \overline{BC}$

$\overline{KE}$ and $\overline{TE}$ are tangent to $\odot I$.

$\overline{KI} = 7.3$, $\overline{TE} = 24.2$. Find the perimeter of $\square$ KITE.



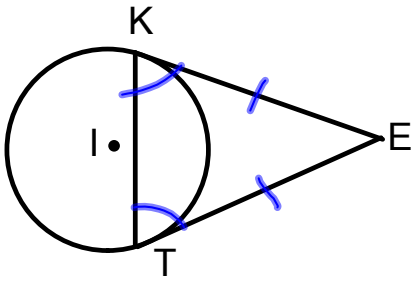
$2(7.3)+2(24.2)$

$14.6+48.4$

63

$\overline{KE}$ and $\overline{TE}$ are tangent to $\odot I$.

If $m\angle T = 49$, find $m\angle E$.



$180 - (49 + 49)$

$m\angle E = 82$

Homework

Pages 767 - 768

6 - 26 even