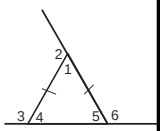
Monday, February 11, 2013
Agenda

- TISK & 2 MM
- Lesson 9-5: Tangents
- Homework: 9-5 problems in packet 2

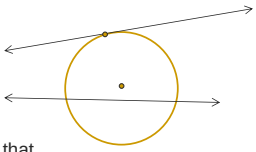
TISK Problems

1. Simplify completely: $\frac{27x}{15x^2+9x^3}$
2. Write the equation of a line in slope-intercept form that passes through the point (3,-8) and is perpendicular to the line $y = \frac{3}{5}x + 1$.
3. Name an angle congruent to angle 3; state theorems or postulates that justify your answer.



§9-5 Tangents

- Definitions
  - Secant
  - Tangent



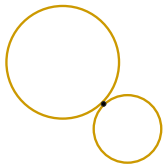
A secant is a line that passes through a circle, intersecting the circle twice.

A tangent is a line that passes through a circle, intersecting the circle exactly once.

The point where the line intersects the circle is called the ***point of tangency.***

More Definitions

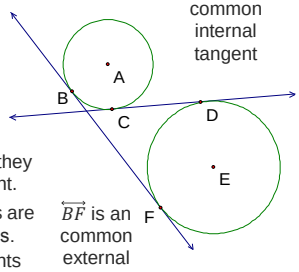
- Definitions
  - Tangent Circles



Two circles are tangent if they intersect in only one point.

More Definitions

- Definitions
  - Tangent Circles
  - Common Tangent
    - Internal
    - External



$\overleftrightarrow{CD}$ is a common internal tangent

Two circles are tangent if they intersect in only one point.

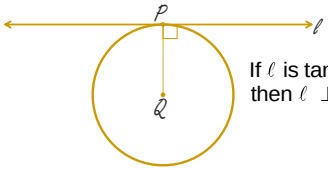
Common internal tangents are "between" the two circles.

Common external tangents are "outside" the two circles.

$\overleftrightarrow{BF}$ is an common external tangent

Theorems

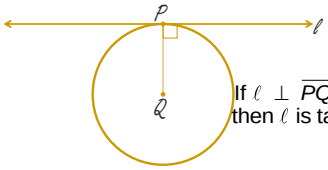
- If a line is tangent to a circle, then it is perpendicular to the radius drawn to the point of tangency.



If ℓ is tangent to $\odot Q$ at P then $\ell \perp \overline{PQ}$

Theorems

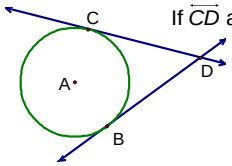
- In a plane, if a line is perpendicular to a radius of a circle at its endpoint on the circle, then the line is tangent to the circle.



If $\ell \perp \overline{PQ}$ at P then ℓ is tangent to $\odot Q$ at P

Theorems

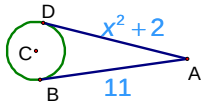
- Theorem
  - If two segments from the same exterior point are tangent to a circle, then they are congruent.



If $\overline{CD}$ and $\overline{BD}$ are tangent to $\odot A$
then $\overline{CD} \cong \overline{BD}$

Example 1. Find the value of x.

$\overleftrightarrow{AB}$ is tangent to $\odot C$ at B
$\overleftrightarrow{AD}$ is tangent to $\odot C$ at D



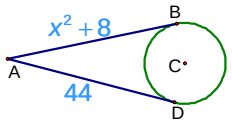
$$\begin{array}{rcl} & = & \\ -2 & & -2 \end{array}$$

$$\sqrt{x^2} = \sqrt{9}$$

$$x = \pm 3$$

Example 2. Find the value of x.

$\overleftrightarrow{AB}$ is tangent to $\odot C$ at B
$\overleftrightarrow{AD}$ is tangent to $\odot C$ at D



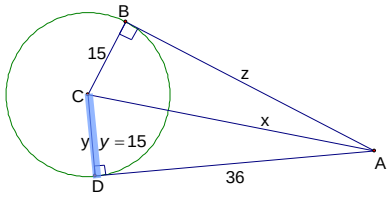
$$\begin{array}{rcl} & = & \\ -8 & & -8 \end{array}$$

$$\sqrt{x^2} = \sqrt{36}$$

$$x = \pm 6$$

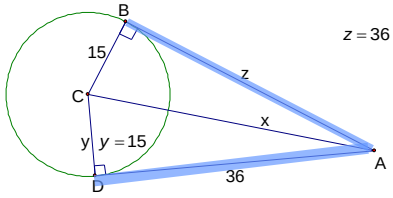
Your Turn:

- Find the values of *x*, *y*, and *z* in the diagram.



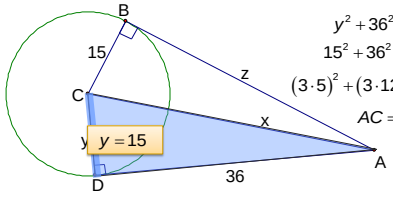
Your Turn:

- Find the values of *x*, *y*, and *z* in the diagram.



Your Turn:

- Find the values of *x*, *y*, and *z* in the diagram.



$y^2 + 36^2 = (AC)^2$

$15^2 + 36^2 = (AC)^2$

$(3 \cdot 5)^2 + (3 \cdot 12)^2 = (AC)^2$

$AC = 3 \cdot 13 = 39$

$39 = x + 15$

$x = 24$

$z = 36$

Prove it!

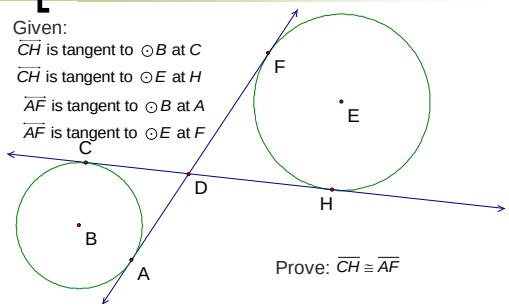
Given:

$\overleftrightarrow{CH}$ is tangent to $\odot B$ at C

$\overleftrightarrow{CH}$ is tangent to $\odot E$ at H

$\overleftrightarrow{AF}$ is tangent to $\odot B$ at A

$\overleftrightarrow{AF}$ is tangent to $\odot E$ at F



Prove: $\overline{CH} \cong \overline{AF}$

Prove it!

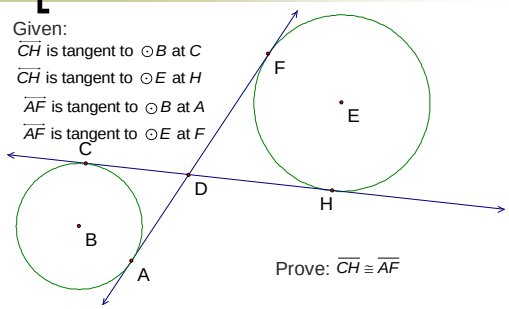
Given:

$\overleftrightarrow{CH}$ is tangent to $\odot B$ at C

$\overleftrightarrow{CH}$ is tangent to $\odot E$ at H

$\overleftrightarrow{AF}$ is tangent to $\odot B$ at A

$\overleftrightarrow{AF}$ is tangent to $\odot E$ at F



Prove: $\overline{CH} \cong \overline{AF}$

Prove it!

Given:

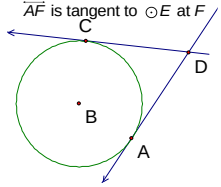
$\overleftrightarrow{CH}$ is tangent to $\odot B$ at C

$\overleftrightarrow{CH}$ is tangent to $\odot E$ at H

$\overleftrightarrow{AF}$ is tangent to $\odot B$ at A

$\overleftrightarrow{AF}$ is tangent to $\odot E$ at F

$\overline{CD} \cong \overline{AD}$



Prove: $\overline{CH} \cong \overline{AF}$

Prove it!

Given:

$\overline{CH}$ is tangent to $\odot B$ at C

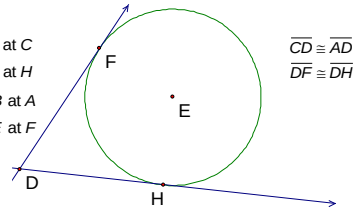
$\overline{CH}$ is tangent to $\odot E$ at H

$\overline{AF}$ is tangent to $\odot B$ at A

$\overline{AF}$ is tangent to $\odot E$ at F

$\overline{CD} \cong \overline{AD}$

$\overline{DF} \cong \overline{DH}$



Prove: $\overline{CH} \cong \overline{AF}$

Prove it!

Given:

$\overline{CH}$ is tangent to $\odot B$ at C

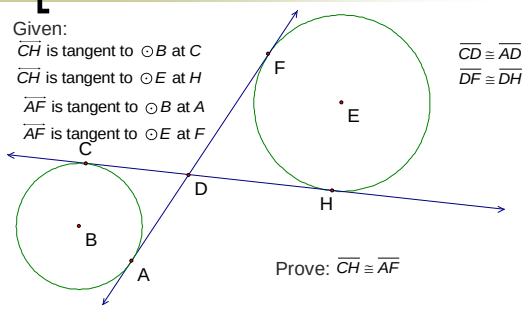
$\overline{CH}$ is tangent to $\odot E$ at H

$\overline{AF}$ is tangent to $\odot B$ at A

$\overline{AF}$ is tangent to $\odot E$ at F

$\overline{CD} \cong \overline{AD}$

$\overline{DF} \cong \overline{DH}$



Prove: $\overline{CH} \cong \overline{AF}$

Prove it!

Given:

$\overline{CH}$ is tangent to $\odot B$ at C

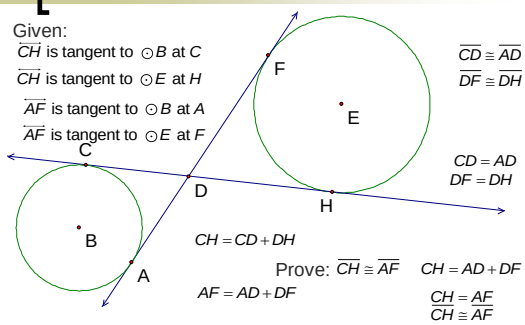
$\overline{CH}$ is tangent to $\odot E$ at H

$\overline{AF}$ is tangent to $\odot B$ at A

$\overline{AF}$ is tangent to $\odot E$ at F

$\overline{CD} \cong \overline{AD}$

$\overline{DF} \cong \overline{DH}$



$CD = AD$

$DF = DH$

$CH = CD + DH$

Prove: $\overline{CH} \cong \overline{AF}$

$CH = AD + DF$

$AF = AD + DF$

$CH = AF$

$\overline{CH} \cong \overline{AF}$