

Name: _____ Period: _____

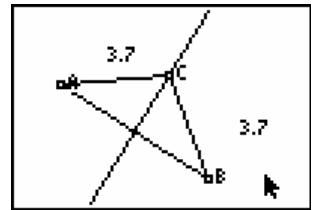
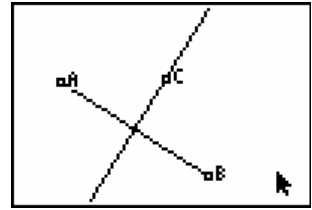
Date: _____

Geometry: Bisectors in Triangles

Part 1: Perpendicular Bisector Theorem

Draw a segment and a perpendicular bisector.

- Draw a non-horizontal segment \overline{AB}
- Draw the perpendicular bisector of segment \overline{AB} .
- Place point C on the perpendicular bisector.
- Draw segments \overline{AC} and \overline{BC} .
- Measure the length of segments \overline{AC} and \overline{BC} .



Exploration:

- ∇ Drag point C to six different locations and copy the lengths of segments \overline{AC} and \overline{BC} in the table below.

Location	1	2	3	4	5	6
Length \overline{AC}						
Length \overline{BC}						

- ∇ Study the data in the table above. Complete this conjecture about how lengths \overline{AC} and \overline{BC} are related.

If point C is on the perpendicular bisector \overline{AB} , then $\overline{AC} = \underline{\hspace{2cm}}$.

- ∇ Generalize your conjecture.

If a point is on the perpendicular bisector of a segment, then it is _____.

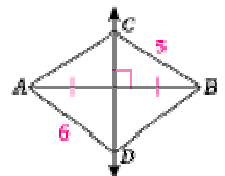
1. Turn to page 249 in your textbook and copy Theorem 5-2 and Theorem 5-3.

- a. Theorem 5-2 -- _____

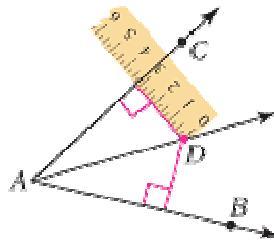
- b. Theorem 5-3 -- _____

2. Use the information given in the diagram. \overline{CD} is the perpendicular bisector of \overline{AB} .

- a. Find CA (the length of segment \overline{CA}). _____
- b. Find DB . _____



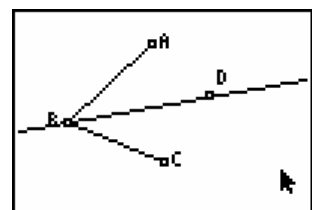
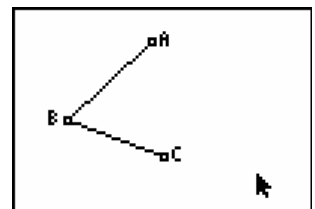
The **distance from a point to a line** is the length of the perpendicular segment from the point on the line. In the diagram, \overline{AD} is the bisector of $\angle CAB$.



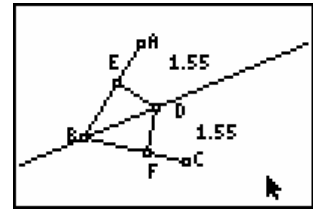
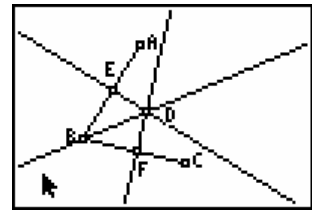
Part 1: Angle Bisector Theorem

Draw an angle and an angle bisector.

- Draw $\angle ABC$
 - Draw segment \overline{AB} .
 - Draw segment \overline{BC} .
- Draw the angle bisector of $\angle ABC$.
 - Press _____ then scroll down to Angle Bis. and press _____.
 - Scroll to point A , press _____.
 - Scroll to point B , press _____.
 - Scroll to point C , press _____.
- Place point D on the angle bisector.



- Draw a line perpendicular to \overline{AB} through point D.
 - Press \perp then scroll to Perp. and press \perp .
 - Scroll to point D and press \perp .
 - Scroll to segment \overline{AB} and press \perp when the segment is dancing.
- Draw a line perpendicular to \overline{BC} through point D.
- Place point E on the **intersection** of segment \overline{AB} .
 - Press \perp then scroll to Point then scroll to the right and choose **Intersection**.
- Place point F on the **intersection** of segment \overline{BC} .
- Hide lines \overline{DE} and \overline{DF} .
 - Press \perp scroll to Hide/Show then scroll to the right and choose **Object**.
 - Scroll to line \overline{DE} and press \perp when the line is dancing.
 - Scroll to line \overline{DF} and press \perp when the line is dancing.
- Draw segments \overline{DE} and \overline{DF} .
- Measure the length of segments \overline{DE} and \overline{DF} .



Exploration:

∇ Drag point D to six different locations and copy the lengths of segments \overline{DE} and \overline{DF} in the table below.

Location	1	2	3	4	5	6
Length \overline{DE}						
Length \overline{DF}						

∇ Study the data in the table above. Complete this conjecture about how lengths \overline{DE} and \overline{DF} are related.
 If a point D is on the bisector of $\angle ABC$, then point D is _____ from the sides of the angle.

∇ Generalize your conjecture.

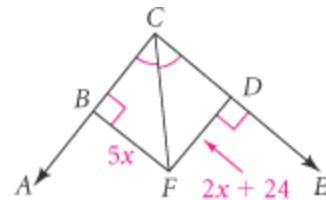
If a point is on the bisector of an angle, then the point is _____ from the sides of the angle.

3. Turn to page 250 in your textbook and copy Theorem 5-2 and Theorem 5-3.

- Theorem 5-4 -- _____

- Theorem 5-5 -- _____

4. Find the value of x, then find FD and FB.



5. According to the diagram,

- how far is K from \overline{EH} ? From \overline{ED} ?
- Find the value of x.
- Find $m\angle DEH$.

