## Angle Bisectors in a Triangle Student Worksheet

Name $\qquad$ Class $\qquad$

In this activity, you will explore:

- The angle bisector of an angle
- The proportional relationship that occurs when an angle bisector in a triangle divides the opposite side into two parts

1. Open the PTE-Geom_AngleBis_EN.tns file on your TI-Nspire ${ }^{\mathrm{TM}}$ math and science learning handheld.

- Use this document to record your answers.


## Problem 1 - The Angle Bisector Theorem

2. What were the measures of the two angles created by your angle bisector ( $\angle \mathrm{BAX}$ and $\angle \mathrm{CAX}$ )?
3. Record some of the measurements from page 1.3 after moving point X :

| Distance from $X$ to side $\overrightarrow{A B}$ | Distance from $X$ to side $\overrightarrow{A C}$ |
| :--- | :--- |
|  |  |
|  |  |
|  |  |

4. Complete the conjecture:

Any point on the angle bisector of an angle is $\qquad$ from the sides of the angle.

## Problem 2 - One Angle Bisector in a Triangle

5. Record some of the measurements from page 2.2 after moving a vertex of $\triangle \mathrm{ABC}$ :

| AB | AC | BD | CD |
| :---: | :---: | :---: | :---: |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |

6. Identify a set of ratios that are equal to each other. Drag a vertex of the triangle to confirm your conjecture.
$\qquad$
7. Apply The Math: Use your proportion to find the missing values for each figure below:



## Problem 3 - One Angle Bisector and the Incenter of a Triangle (optional)

8. What was the value of the ratio $\frac{D I}{D G}$ ? What was the value of the ratio $\frac{D E+D F}{P}$ ?
9. What happens to these values when a vertex of the triangle is dragged?
10. Show the hidden angle bisector of $\angle \mathrm{E}$ or $\angle \mathrm{F}$. Confirm that your conjecture is true for this other bisector. Drag a vertex of the triangle, and observe the results.

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