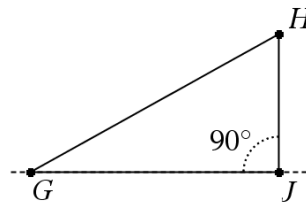
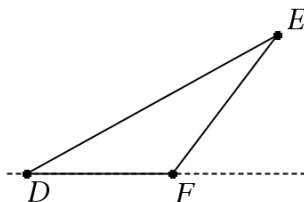
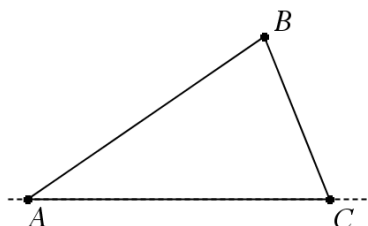




Problem 1 – Exploring the Altitude of a Triangle

1. Define **Altitude of a Triangle**.
2. Construct the altitudes of the triangles on pages 1.3–1.5 on your handheld. After constructing each altitude on your handheld, draw the altitude for each triangle given below.



3. Fill in the blanks of the following statements about whether the altitude of a triangle is inside, outside, or on a side of the triangle.
 - a. For the acute $\triangle ABC$, the altitude of vertex B is _____ the triangle.
 - b. For the obtuse $\triangle DEF$, the altitude of vertex E is _____ the triangle.
 - c. For the right $\triangle GHJ$, the altitude of vertex H is _____ the triangle.

Problem 2 – Exploring the Orthocenter

On page 2.2, you are given $\triangle ABC$. Construct the altitude of each vertex of the triangle. Using page 2.2, answer the following questions. These questions are also on pages 2.3–2.6.

4. What do you notice about the altitudes of all three vertices?
5. The point of concurrency for the altitudes is the **orthocenter**. On page 2.2, create and label this point R . Is it possible to move vertex B so that the orthocenter is on a side of $\triangle ABC$? If so, what kind of triangle is $\triangle ABC$ in this case?
6. Can you move vertex B so that the orthocenter is inside of $\triangle ABC$? If so, what kind of triangle is $\triangle ABC$ in this case?
7. Can you move vertex B so that the orthocenter is outside of $\triangle ABC$? If so, what kind of triangle is $\triangle ABC$ in this case?

Problem 3 – Exploring the Altitude of an Equilateral Triangle

On page 3.1, you are given an equilateral triangle ABC with altitude \overline{BD} and point P on the inside of the triangle. Find the distance from point P to the three sides of the triangle using the **Length** tool found by pressing **MENU > Measurement > Length**. Also, find the length of \overline{BD} and answer the following questions.

8. Use the **Calculate** tool to calculate $EP + FP + GP$. Move point A to 2 different positions and record the measurements in the table below. Next, move point P to 2 different positions and record the measurements in the table below.

Position	1 st position	2 nd position	3 rd position	4 th position
BD				
$EP+FP+GP$				

9. What is the relationship between the measurements of BD and $EP + FP + GP$?
10. Complete the following statement: The sum of the distances from any point in the interior of an equilateral triangle to the sides of the triangle is _____.

Problem 4 – Exploring the Orthocenter of a Medial Triangle

The **medial triangle** is the triangle formed by connecting the midpoints of the sides of a triangle.

On page 4.1 you are given a triangle, its medial triangle, and the orthocenter of the medial triangle.

11. What triangle center (centroid, circumcenter, incenter, or orthocenter) for $\triangle ABC$ is the orthocenter, O , of the medial $\triangle DEF$?