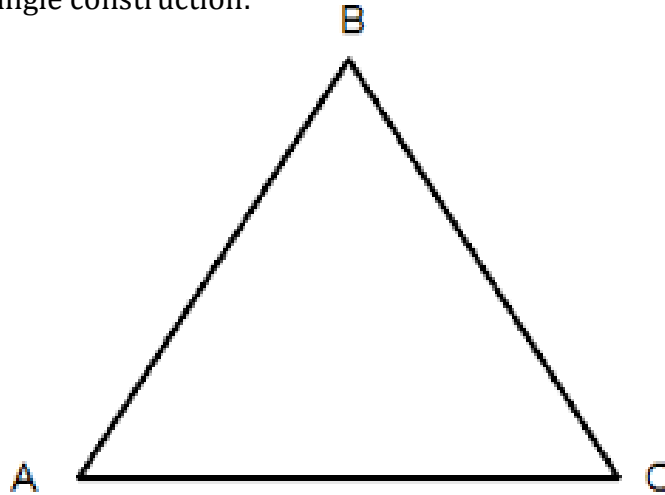


## Altitudes of Triangles

Learning Target: To construct and define altitudes of triangles and to locate the point of concurrency called the orthocenter.

1.) Altitude of a triangle construction:



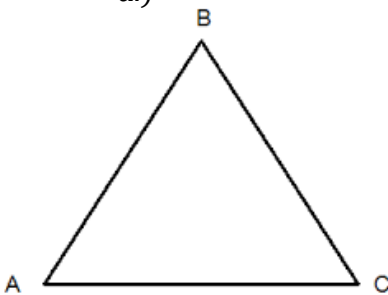
Altitude of a triangle definition:

2.) Now draw two other altitudes from the other vertices above.

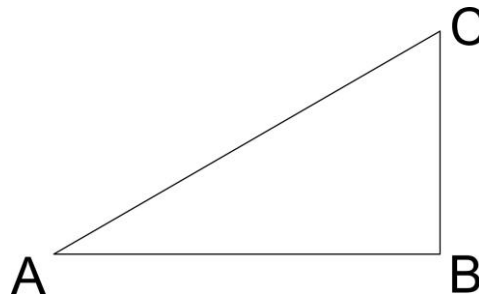
Orthocenter:

3.) Different ways of locating a triangle altitude: Draw the altitudes of the different triangles and identify the orthocenter. Make conclusions.

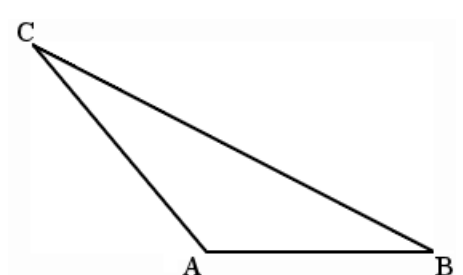
a.)



b.)



c.)

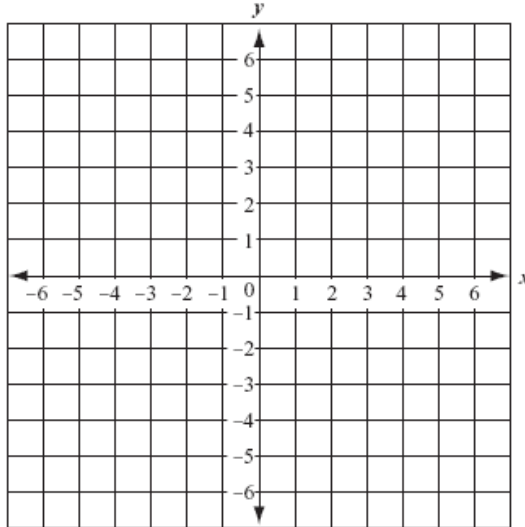


## Altitudes of Triangles

**Example: Find the orthocenter**

Find the coordinates of the orthocenter of  $\triangle XYZ$  with vertices  $X(-5, -1)$ ,  $Y(-2, 4)$ ,  $Z(3, -1)$ .

Step 1: Plot the points and create  $\triangle XYZ$  and label.



Step 2: Find an equation of the line that contains the altitude from  $Y$  to  $\overline{XZ}$ .

Step 3: Find an equation of the line that contains the altitude from  $X$  to  $\overline{YZ}$ .

Step 4: Find the point of intersection of the two lines from steps 2 and 3.

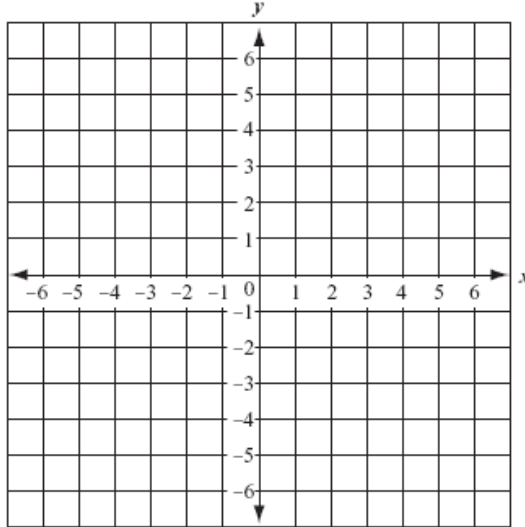
Answer: \_\_\_\_\_

## Altitudes of Triangles

**Homework: Find the orthocenter**

Find the coordinates of the orthocenter of  $\triangle ABC$  with vertices  $A(-3, -4)$ ,  $B(-3, 4)$ ,  $C(5, 4)$ .

Step 1: Plot the points and create  $\triangle ABC$  and label.



Step 2: Find an equation of the line that contains the altitude from B to  $\overline{AC}$ .

Step 3: Find an equation of the line that contains the altitude from A to  $\overline{BC}$ .

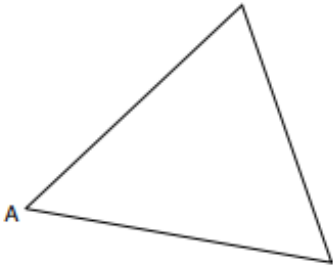
Step 4: Find the point of intersection of the two lines from steps 2 and 3.

Answer: \_\_\_\_\_

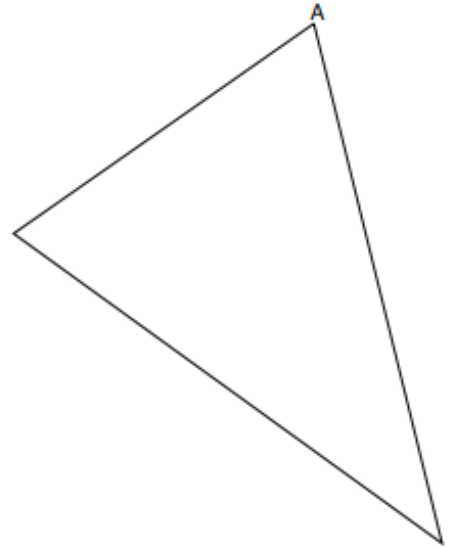
## Altitudes of Triangles

Draw all three altitudes and label the orthocenter for each triangle. (Use a protractor)

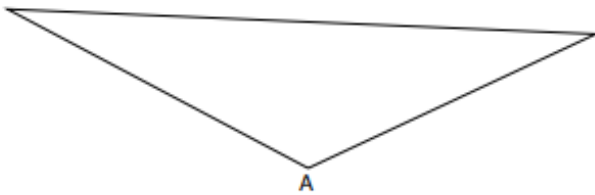
1)



2)



3)



4)

