

## 3-5R: Applications of Perpendicular Lines

### Agenda:

- Check & Review 3-4 Problem Set
- Quiz
- Guided Notes

### Homework:

- 3-5 Worksheet

$$\begin{aligned} 6y &= 90 \\ y &= \end{aligned}$$

$$\begin{aligned} 5x + 4y &= 90 \\ 6y &= 90 \end{aligned}$$


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$$x + y + x = 180$$

$$\textcircled{1} \quad 2x + y = 180$$

$$-x + y = 0$$

$$2y = x + y$$

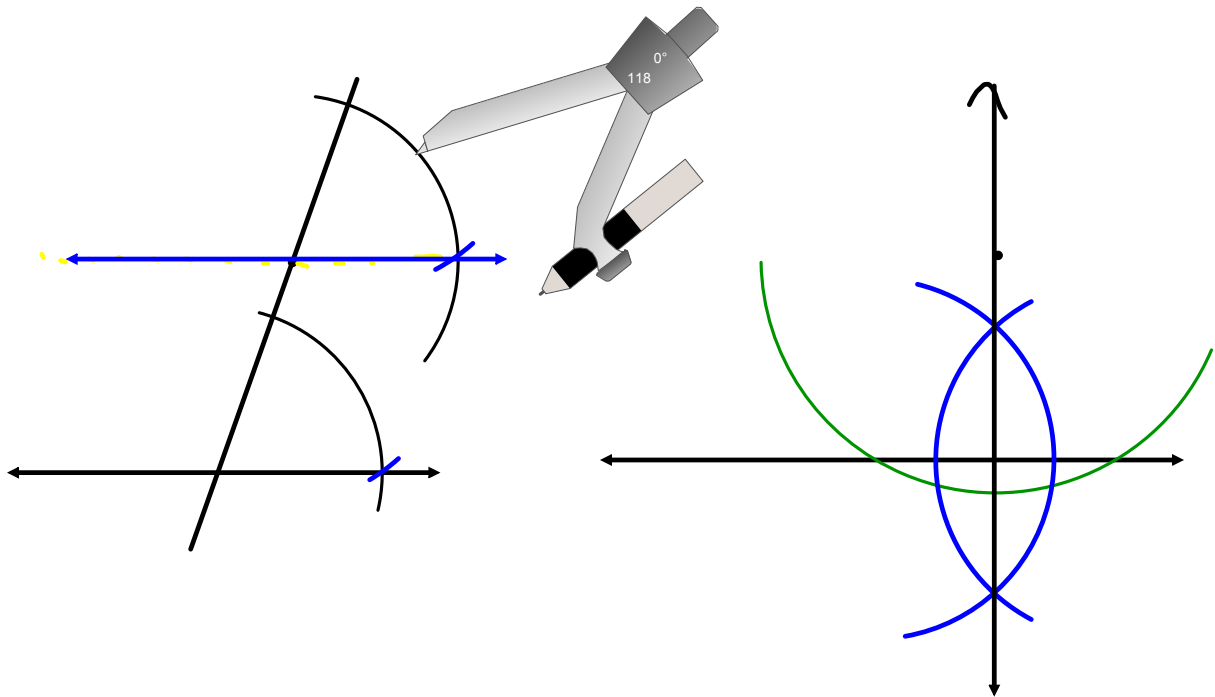
$$\textcircled{2} \quad y = x$$

$$2 \textcircled{1} \quad 3x - 2y = 10$$

$$\textcircled{2} \quad 5x + 4y = 15$$

# Parallel

# Perpendicular

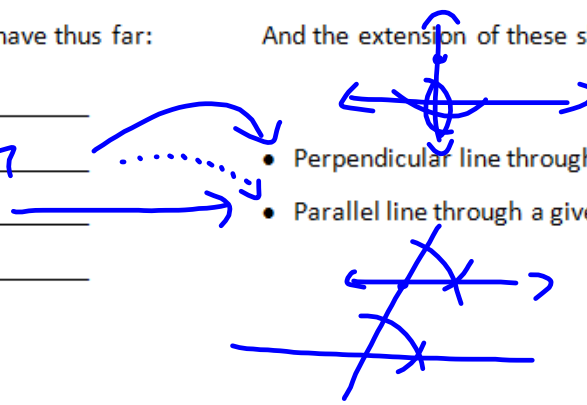


Consider the base construction skills you have thus far:

- COPY SEG
- BISECT SEG
- COPY  $\angle$
- BISECT  $\angle$

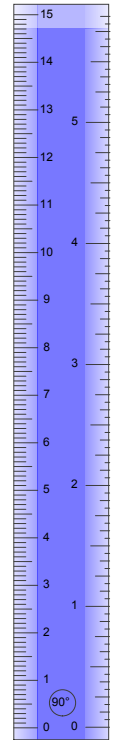
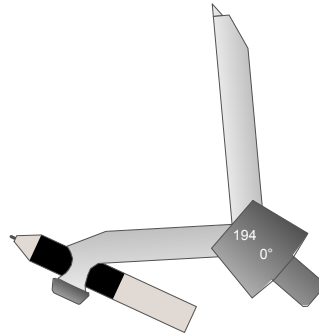
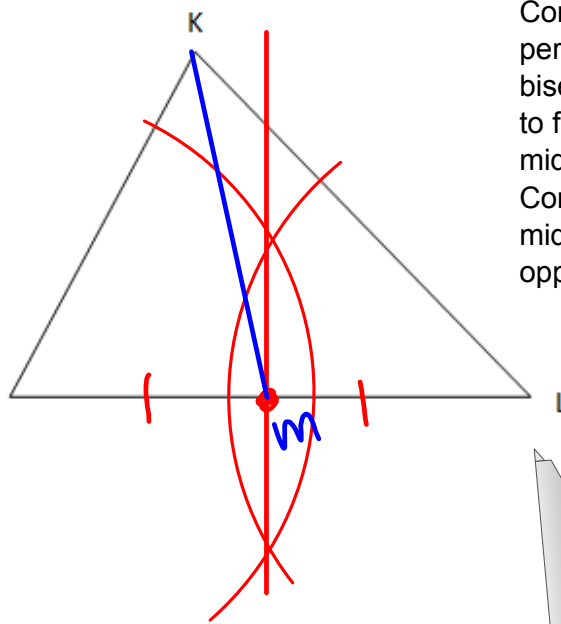
And the extension of these skills:

- Perpendicular line through a given point
- Parallel line through a given point



Construct a median of  $\triangle JKL$

What is the definition of a median of a triangle?  
**MIDPOINT**  
**→ OPP VERTEX**

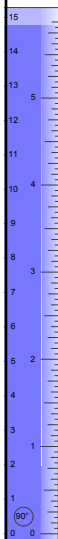
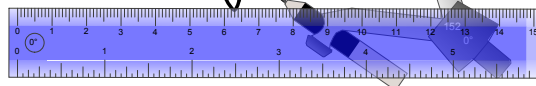
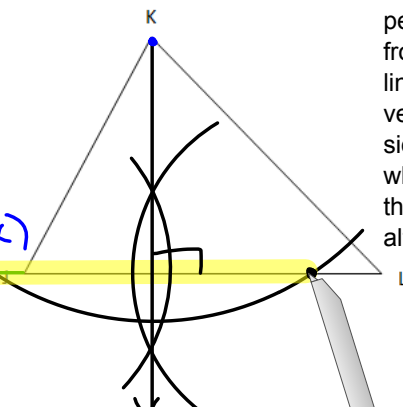


**Explain your construction:**

Construct the perpendicular bisector of a side to find the midpoint. Connect the midpoint to the opposite vertex.

Construct an altitude of  $\triangle JKL$

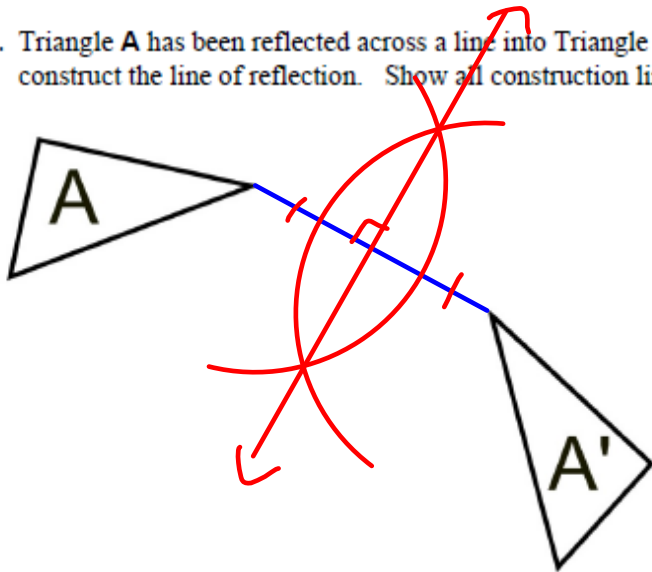
How does an altitude relate to the base of a triangle?  
**FROM PT OFF (VERTEX)**  
 Note: may have to extend a side!



**Explain your construction:**

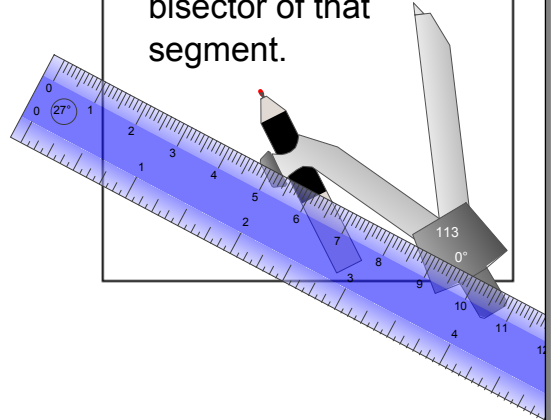
Construct the perpendicular to a side using perpendicular line from a point off the line (which is the vertex opposite the side). This segment where the line meets the side is the altitude.

1. Triangle **A** has been reflected across a line into Triangle **A'**. Using a compass and straightedge, construct the line of reflection. Show all construction lines.

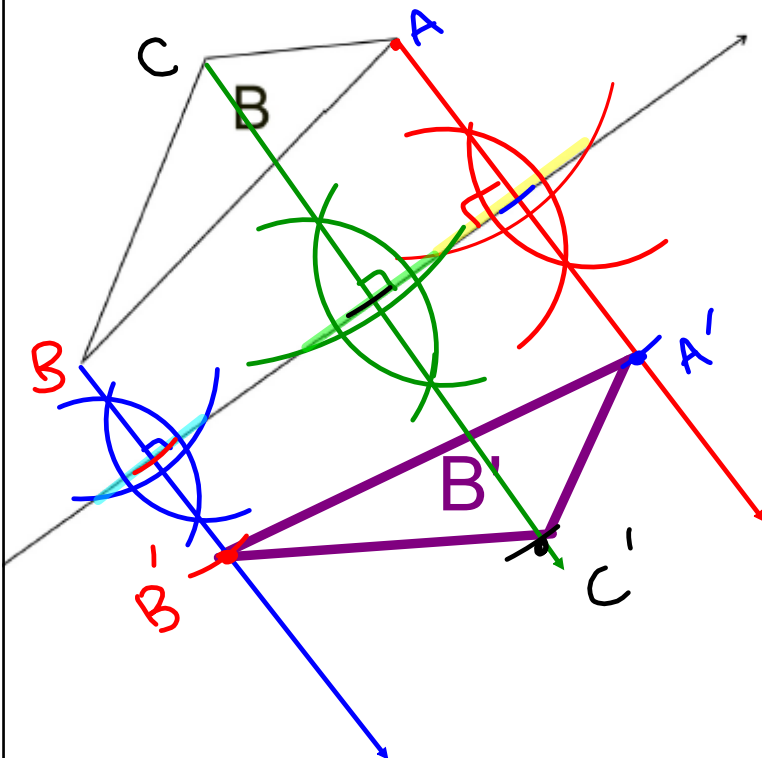


Describe the approach you used in this construction, explaining why you did what you did.

Connect an image vertex to its pre-image. Then do the perpendicular bisector of that segment.



2. Triangle **B** is to be reflected across the given line. Using a compass and straightedge, construct the location of the image, triangle **B'**. Show all construction lines.



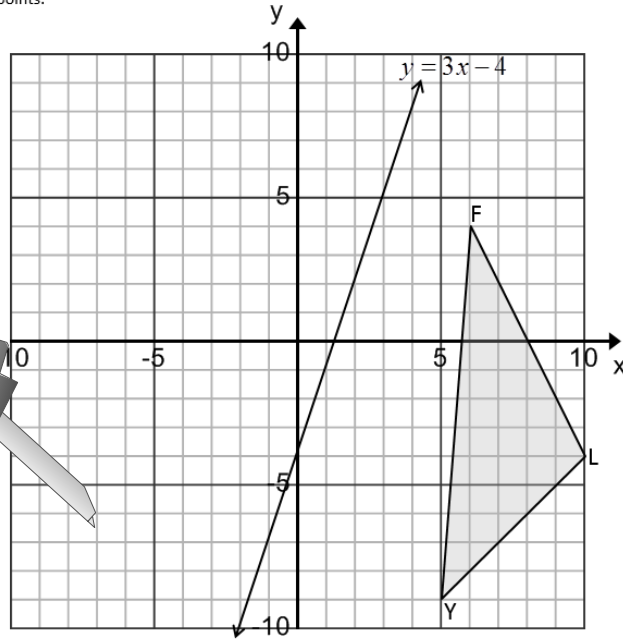
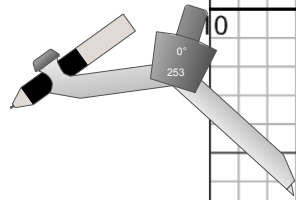
Describe the approach you used in this construction, explaining why you did what you did.

Construct a perpendicular line from a point not on the line for each vertex. Then copy the segment length into the line of reflection over to locate the image of each vertex.

PERPENDICULAR CONSTRUCTIONS IN THE COORDINATE PLANE

1) LINE REFLECTIONS: Using a formal construction, reflect the triangle into the line  $y = 3x - 4$ . State the coordinates of the image points.

F' \_\_\_\_\_  
 L' \_\_\_\_\_  
 Y' \_\_\_\_\_



What is the slope of the given line of reflection? \_\_\_\_\_

What is the slope of the rays you constructed to be perpendicular to the line of reflection? \_\_\_\_\_

How do these numbers relate? \_\_\_\_\_

2) ROTATIONS:

a. Use your universal angle maker to rotate point P around the origin  $90^\circ$ .

What do you see about the slopes of the rays you drew? \_\_\_\_\_

b. Using a formal construction, rotate point A around point B by  $90^\circ$ .

Compare the slopes of the rays. They are \_\_\_\_\_

