Frequently Asked Questions

Q: How do you construct a perpendicular bisector?

A1: Fold a line segment end to end to find the midpoint. The crease creates the perpendicular bisector of the line segment.

A2: Use a transparent mirror to reflect one endpoint of a line segment onto the other endpoint. Draw along the edge of the mirror.

A3: Use a compass to draw intersecting circles from each end of a line segment. The line that joins the points of intersection is the perpendicular bisector.

A4: Use a protractor to draw a 90° angle at the midpoint of a line segment.
Q: How do you construct parallel line segments?

A1: Draw a rectangle using a transparent mirror, a protractor, or an X made with two line segments that are the same length and cross at their midpoints. Lines along the top and bottom, or along the sides, are parallel.

A2: Construct the perpendicular bisector of a line segment. Construct the perpendicular bisector of the first perpendicular bisector. The original line segment and the second perpendicular bisector are parallel.

Q: How do you construct an angle bisector?

A1: Fold the rays of the angle on top of each other. The crease is the angle bisector.

A2: Place a transparent mirror in the angle so that one ray reflects onto the other. Draw along the edge of the mirror.

A3: Use a compass, with its point on the vertex of the angle, to draw an arc across both arms of the angle. Move the compass point to the points where the arc and the rays meet, and draw two intersecting arcs. Then draw a line from the intersection of the arcs to the vertex of the angle. This line is the angle bisector.
Practice

Lesson 7.2

1. Which of the following points matches each description? Explain how you know.
   
   $(-14, 0), (0, 0), (14, 0), (0, 14), (0, -14)$
   
   a) farthest right                 c) lowest down
   b) farthest left                  d) highest up

Lesson 7.3

2. a) Draw quadrilateral $ABCD$ with vertices $A(0, 2)$, $B(3, 1)$, $C(3, -2)$, and $D(-1, -1)$.
   
   b) Reflect $ABCD$ in the $y$-axis to produce $A'B'C'D'$.
   
   c) Determine the coordinates of $A'B'C'D'$.
   
   d) Translate $A'B'C'D'$ 2 units to the left and 1 unit up to produce $A''B''C''D''$.
   
   e) Determine the coordinates of $A''B''C''D''$.

3. a) Draw a triangle anywhere in the 1st quadrant. Label the vertices and name their coordinates.
   
   b) Describe a translation that will produce an image of your triangle in the 3rd quadrant. Label the vertices of the image and name the coordinates.
   
   c) Describe a reflection that will produce an image of the image in the 2nd quadrant. Label the vertices of the new image and name its coordinates.

Lesson 7.4

4. $\triangle ABC$ has coordinates $A(-1, 3)$, $B(-2, 0)$, and $C(1, -1)$.
   
   a) Draw $\triangle ABC$.
   
   b) Rotate $\triangle ABC$ 90° ccw about $B$.

5. How can you transform triangle 1 to match triangle 2? Describe as many ways as you can.
Lesson 7.5

6. A figure has vertices $A(2, 0), B(6, 0), C(7, 3),$ and $D(3, 3)$. The image of the figure after a transformation has vertices $A'(-1, -4), B'(-5, -4), C'(-6, -1),$ and $D'(-2, -1)$.
   a) Draw the figure and its image on a coordinate grid.
   b) Describe how to create the image using transformations. Explain your thinking.

Lesson 7.6

7. a) Draw two line segments that are 8 cm long. Label one line segment $AB$ and the other line segment $CD$.
   b) Construct the perpendicular bisectors of the two line segments using different methods.

Lesson 7.7

8. Name three examples of parallel line segments.
9. Construct a pair of parallel line segments.

Lesson 7.8

10. Copy the following angles. Construct the bisector of each angle.

   a) 
   b) 
   c) 
   d) 

11. Describe examples of translations, reflections, rotations, perpendicular bisectors, parallel line segments, and angle bisectors in this quilt square.