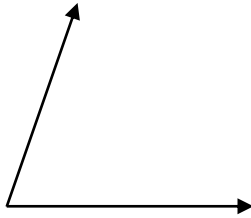**Lesson 2.09 Constructing Parallel Lines**

Students will be able to:

- Content Objective: Construct a line through a point not on a given line parallel to the given line.

- Language Objective: Justify the construction of parallel lines.

Warm Up

Using a compass and straightedge, copy the angle shown below. Be sure to leave all construction marks.

What can we say about these two angles?

Vocabulary Review

In the last lesson we looked at different types of congruent angles. Specifically, we used rigid motions to prove that corresponding angles, vertical angles, and alternate interior angles are congruent. Let's review these important concepts.

The diagram shows $h \parallel j$ with transversal i intersecting both lines to form the angles below.

a. List two pairs of vertical angles.

b. List two pairs of alternate interior angles.

c. List two pairs of corresponding angles.

h

j

i

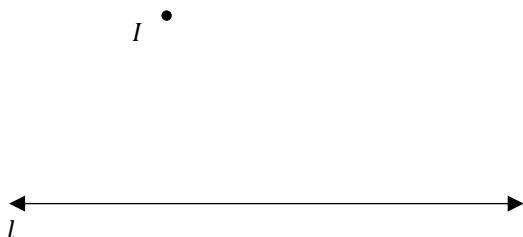| 2 | 3 | | 6 | 7 |
| 1 | 4 | | 5 | 8 |
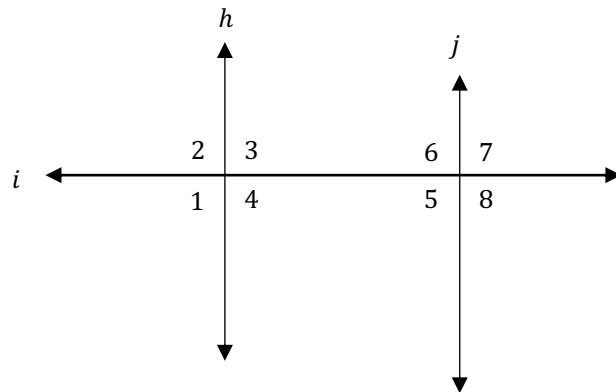
Constructing a Parallel Line Through a Point not a Given Line

Because the steps for constructing a parallel line are more complex, we will use the next page to walk through the process.
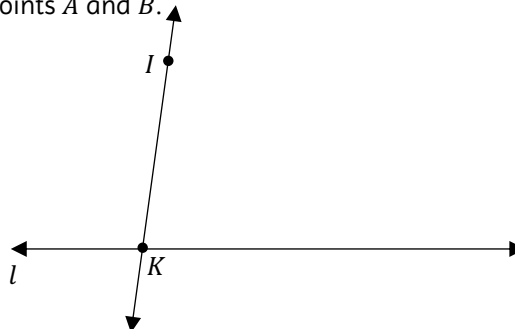

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Skill 1: Constructing Parallel Lines Through a Given Point

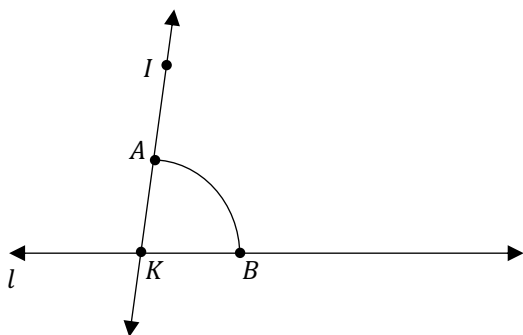Given line l, construct a line through point I, parallel to line l.

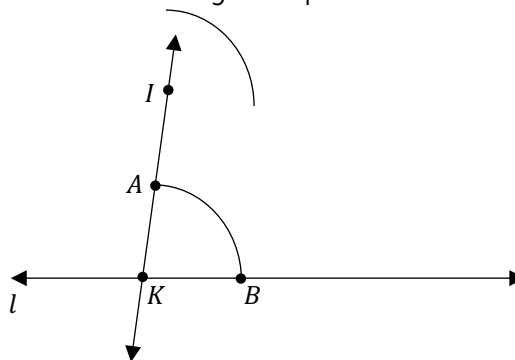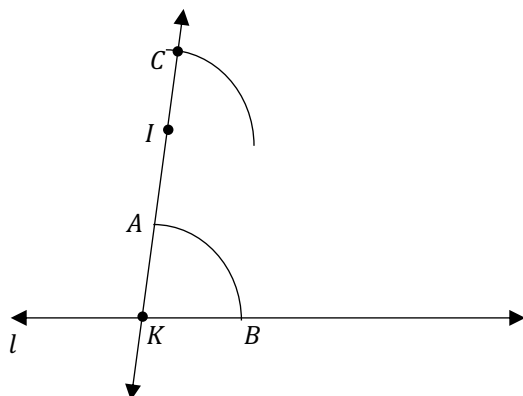| **Step 1:** Construct a line through I so that it intersects line l. Label the intersection point K.	**Step 2:** Place center of compass on K and make an arc intersecting both lines KI and l. Label these points A and B.
Step 3: Without adjusting the compass, place center of compass on point I cand construct an arc similar to arc AB.	**Step 4:** Extend line KI if necessary, so that the arc you created in step 3 intersects line KI. Label this point C. Then measure the distance between points A and B using a compass.
Step 5: Using the length you measured in step 4, place the center of your compass on point C and create an arc that intersects the existing arc. Mark this intersection point and label as point D.	**Step 6:** Draw a line through points I and D such that $\overleftrightarrow{ID} \parallel l$.

![DigitLit math instruction logo]
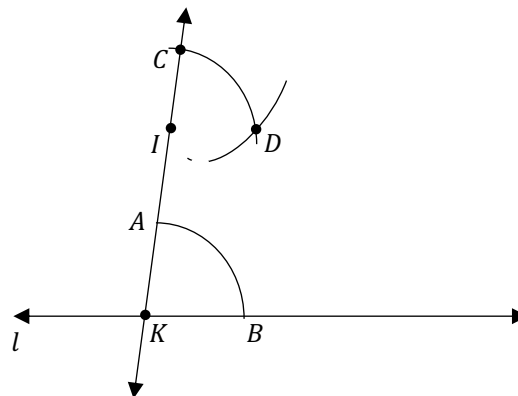
Exercise 1: Constructing Parallel Lines Through a Given Point

Construct a line through point A parallel to line h.

A •

h
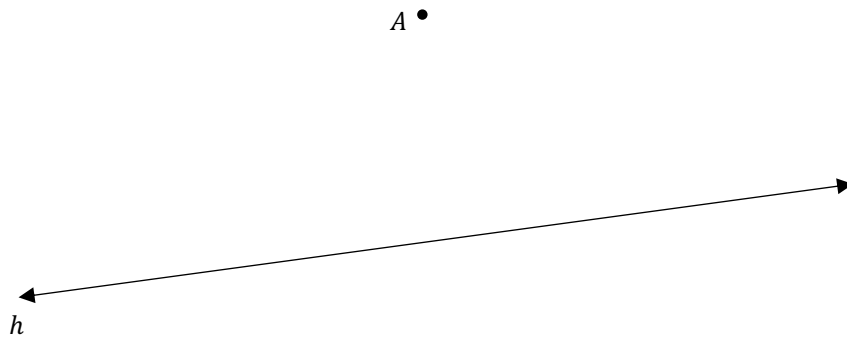
Exercise 2: Justifying Constructions of Parallel Lines Using Measurement

The diagram below illustrates the construction of $\overleftrightarrow{XY}$ parallel to $\overleftrightarrow{WZ}$ through point X.
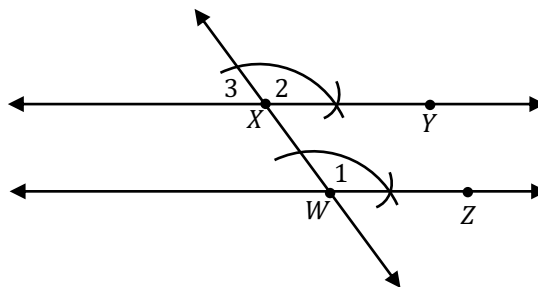
Which statement justifies this construction?

1) $\overline{XY} \cong \overline{WZ}$

2) $\overline{XW} \cong \overline{WZ}$

3) $m\angle 1 = m\angle 3$

4) $m\angle 1 = m\angle 2$

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2.09- Problem Set

Name: _____

1. Check all statements below that justify the construction of parallel lines. Mark an X for the statements that do not justify the construction of parallel lines.

   a. _____ If two lines are cut by a transversal and the alternate interior angles are congruent, the lines are parallel.

   b. _____ If two lines are perpendicular to the same line, then the lines are parallel.

   c. _____ If two lines are cut by a transversal and the same side interior angles are supplementary, the lines are parallel.

   d. _____ If two lines are cut by a transversal and the corresponding angles are congruent, then the lines are parallel.

   e. _____ If two lines in a plane are cut by a transversal to form congruent alternate exterior angles, then the lines are parallel.

   f. _____ If two lines in a plane are perpendicular to a transversal at different points, the lines are parallel to each other.

2. Using a compass and straightedge, construct the line that is parallel to $\overleftrightarrow{AB}$ and goes through point P, not on the line. Leave all construction marks.

$\bullet$
P

$A \xleftrightarrow{\hspace{8cm}} B$