Lesson 11: Defining Reflections

- Let's reflect some figures.

11.1: Which One Doesn't Belong: Crossing the Line

Which one doesn't belong?

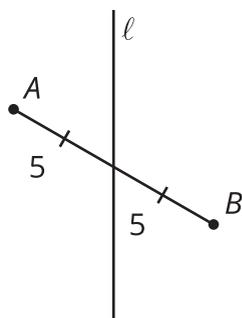**Figure 1**

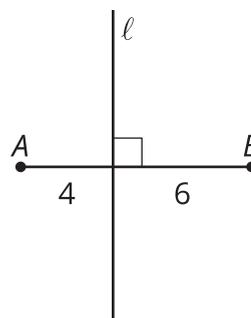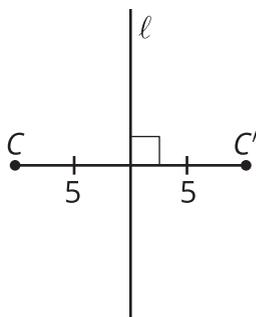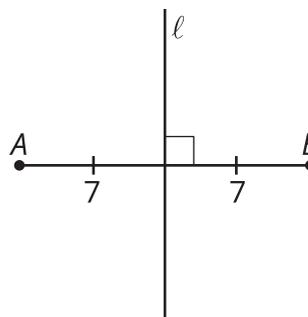

Figure 2

Figure 3

Figure 4

## 11.2: Info Gap: What's the Point: Reflections

Your teacher will give you either a problem card or a data card. Do not show or read your card to your partner.

If your teacher gives you the data card:

1. Silently read the information on your card.
2. Ask your partner "What specific information do you need?" and wait for your partner to ask for information. Only give information that is on your card. (Do not figure out anything for your partner!)
3. Before telling your partner the information, ask "Why do you need to know (that piece of information)?"
4. Read the problem card, and solve the problem independently.
5. Share the data card, and discuss your reasoning.

If your teacher gives you the problem card:

1. Silently read your card and think about what information you need to answer the question.
2. Ask your partner for the specific information that you need.
3. Explain to your partner how you are using the information to solve the problem.
4. When you have enough information, share the problem card with your partner, and solve the problem independently.
5. Read the data card, and discuss your reasoning.
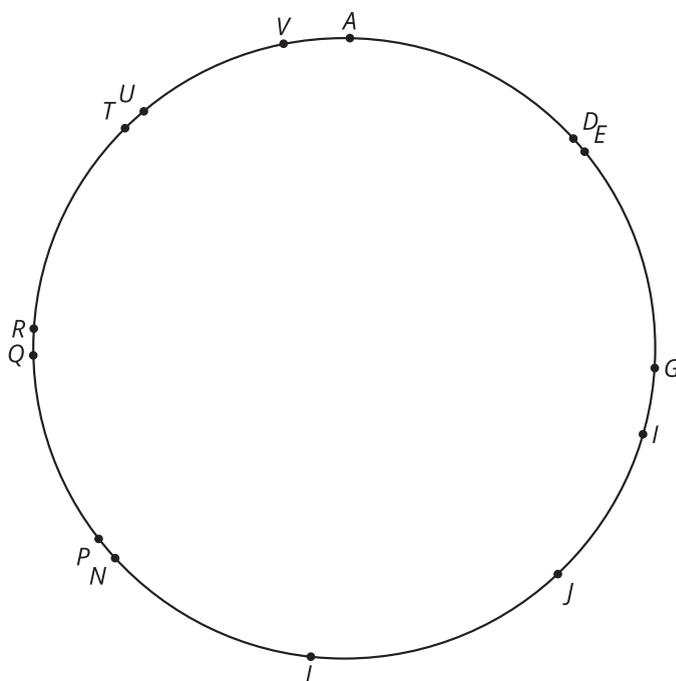
11.3: Triangle in the Mirror

Kiran started reflecting triangle CDE across line m. So far, he knows the image of D is D' and the image of E is E'.

1. Annotate Kiran's diagram to show how he reflected point D.
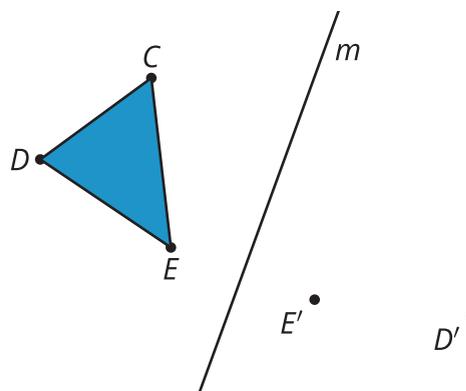
2. Use straightedge and compass moves to determine the location of C'. Then lightly shade in triangle $C'D'E'$.

3. Write a set of instructions for how to reflect any point P across a given line ℓ.

Kiran's Diagram
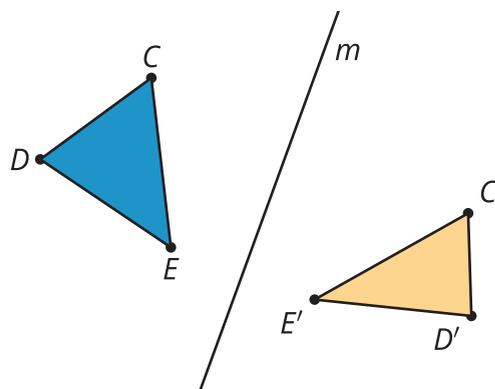
4. Elena found C' incorrectly. Elena is convinced that triangle $C'D'E'$ "looks fine." Explain to Elena why her C' is not a reflection of point C across line m.

Elena's Diagram

Are you ready for more?

1. Using your response from question 2 (with the correct location of C'):
   a. Draw the line CC'.

   b. Reflect triangle $C'D'E'$ across line CC'.

   c. Label the image $C''D''E''$.

2. Find a single rigid motion that takes CDE to $C''D''E''$.

Lesson 11 Summary

Think about reflecting the point A across line ℓ:

The image A' is somewhere on the other side of ℓ from A. The line ℓ is the boundary between all the points that are closer to A and all the points that are closer to A'. In other words, ℓ is the set of points that are the same distance from A as from A'. In a previous lesson, we conjectured that a set of points that are the same distance from A as from A' is the perpendicular bisector of the segment AA'. Using a construction technique from a previous lesson, we can construct a line perpendicular to ℓ that goes through A:

A' lies on this new line at the same distance from ℓ as A:

We define the **reflection** across line ℓ as a transformation that takes each point A to a point A' as follows: A' lies on the line through A that is perpendicular to ℓ, is on the other side of ℓ, and is the same distance from ℓ as A. If A happens to be on line ℓ, then A and A' are both at the same location (they are both a distance of zero from line ℓ).