## 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

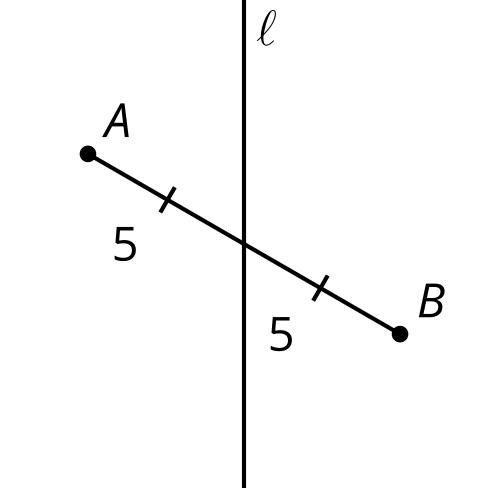


Figure 2

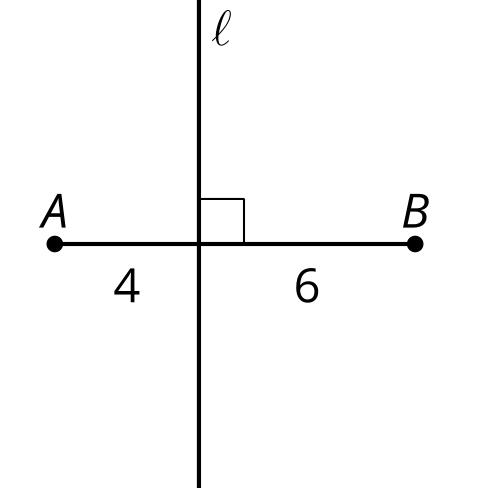


Figure 3

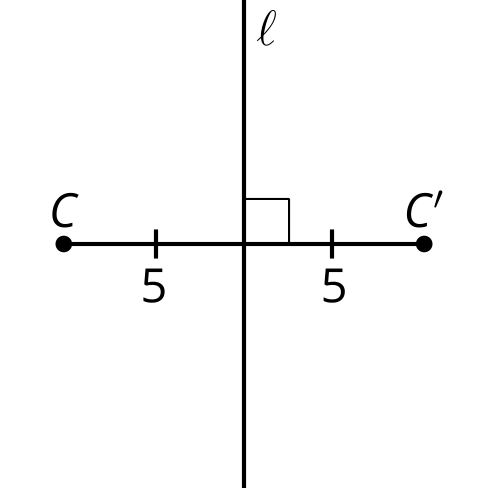
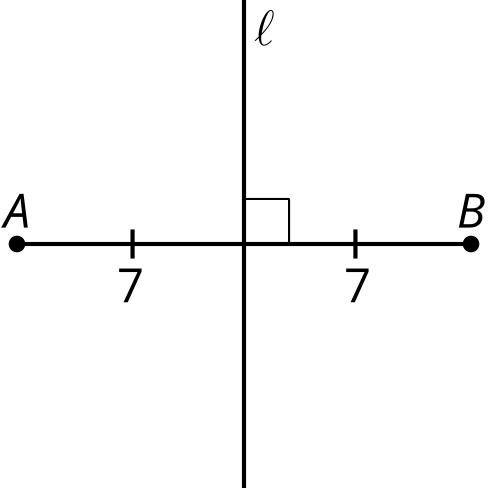


Figure 4



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

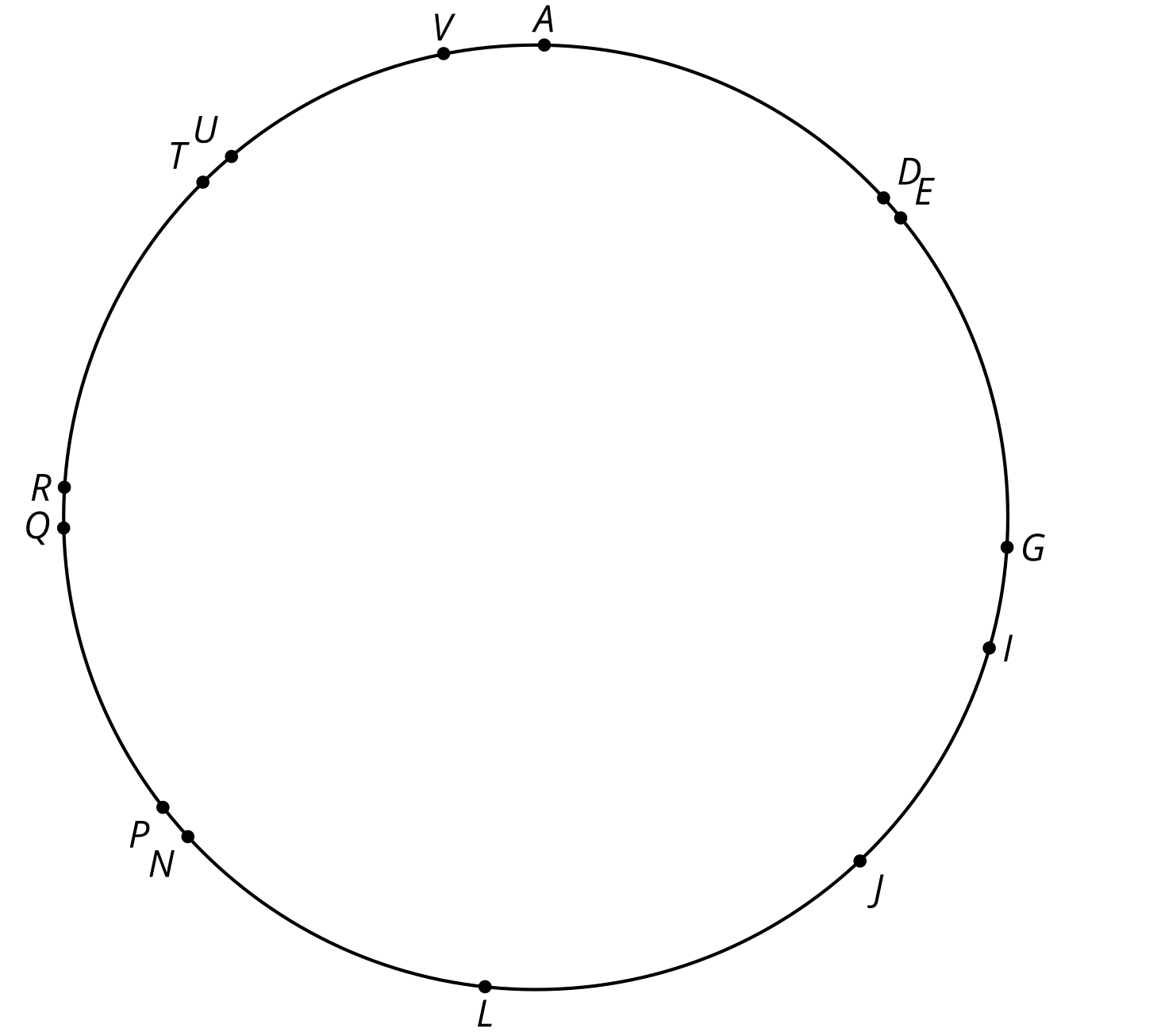
Your teacher will give you either a problem card or a data card. Do not show or read your card to your partner.

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

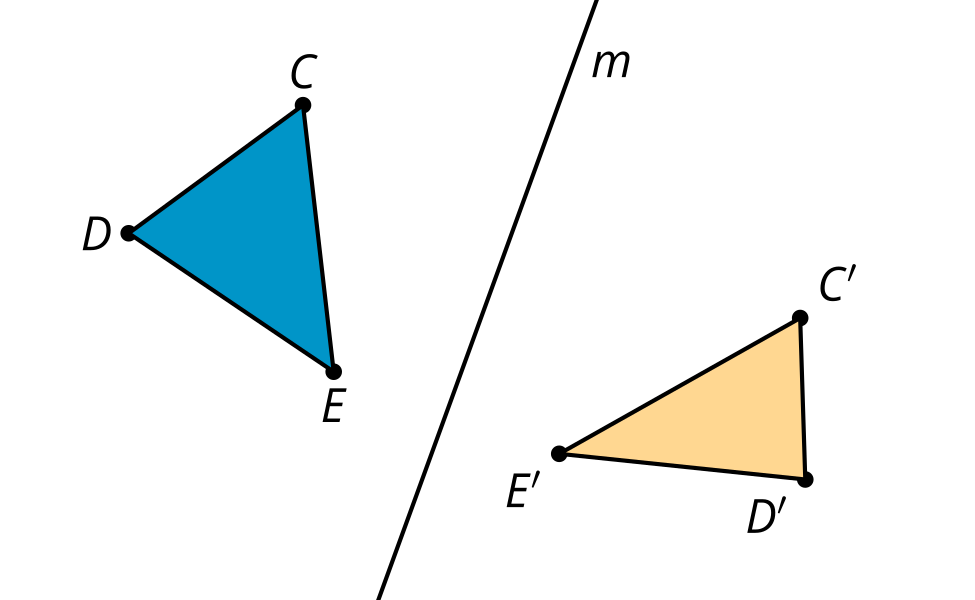
Kiran started reflecting triangle across line . So far, he knows the image of is and the image of is .

1. Annotate Kiran's diagram to show how he reflected point .
2. Use straightedge and compass moves to determine the location of  Then lightly shade in triangle .
3. Write a set of instructions for how to reflect any point across a given line .
4. Elena found incorrectly. Elena is convinced that triangle “looks fine.” Explain to Elena why her  is not a reflection of point across line .

Kiran's Diagram



Elena's Diagram

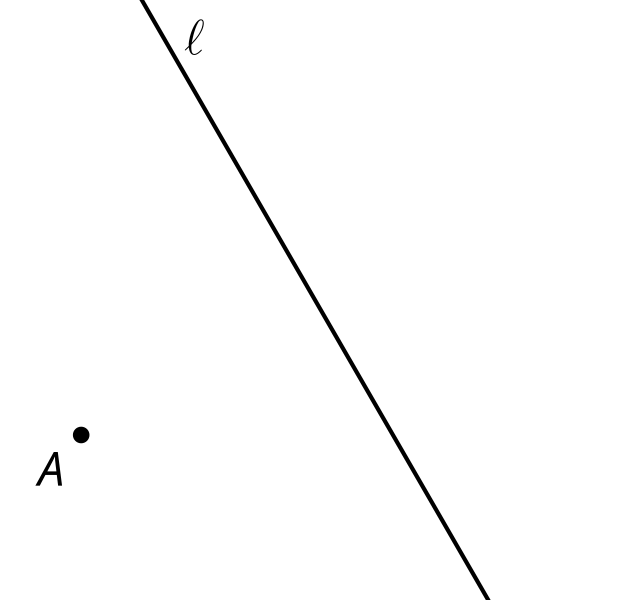


#### Are you ready for more?

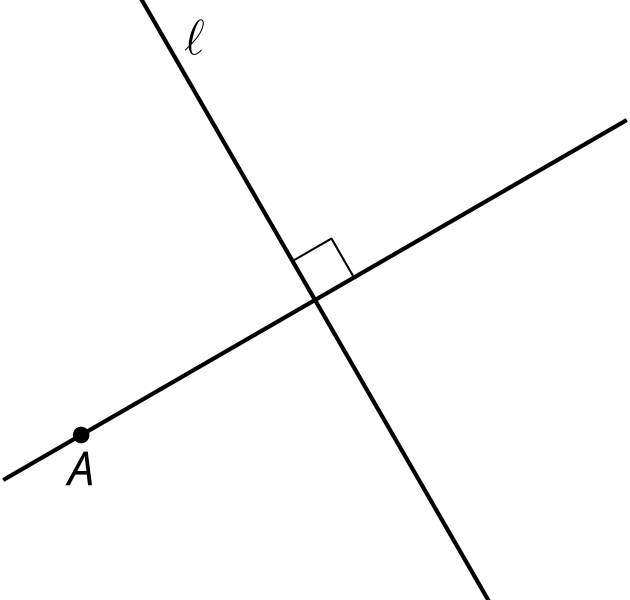
1. Using your response from question 2 (with the correct location of ):
   1. Draw the line .
   2. Reflect triangle  across line .
   3. Label the image .
2. Find a single rigid motion that takes to .

### Lesson 11 Summary

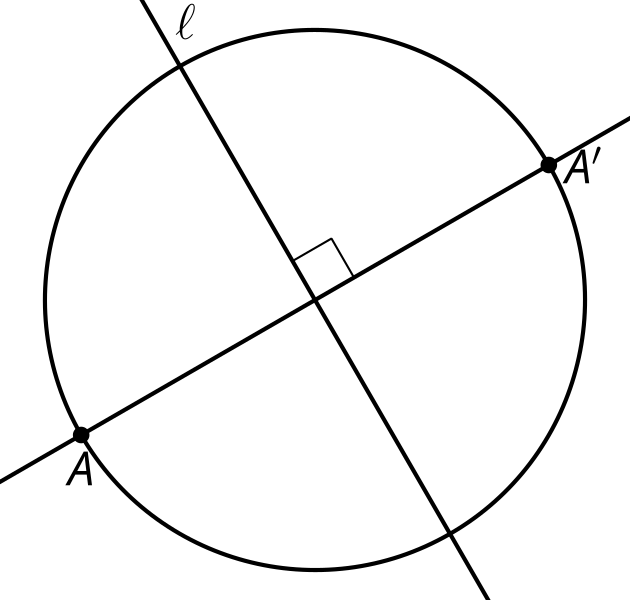
Think about reflecting the point across line :



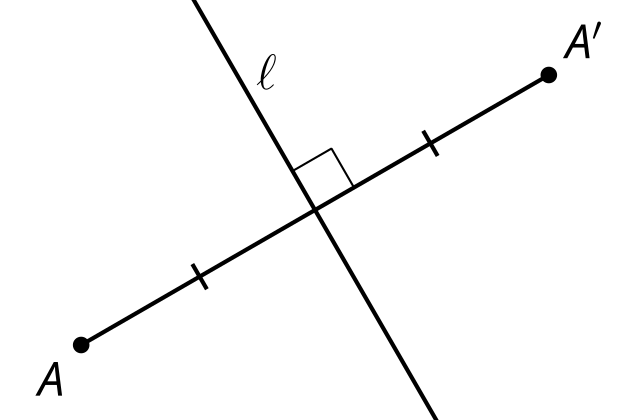
The image is somewhere on the other side of from . The line is the boundary between all the points that are closer to and all the points that are closer to . In other words, is the set of points that are the same distance from as from . In a previous lesson, we conjectured that a set of points that are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



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



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





© CC BY 2019 by Illustrative Mathematics®