IM 9–12 MATH v.1

Unit 1

Constructions and Rigid Transformations

GEOMETRY

Lesson 19

Evidence, Angles, and Proof

Illustrative Mathematics®

Kendall Hunt

Learning Goal

Let's make convincing explanations.

Geometry

Supplementary Angles

Warm-up: Math Talk

Mentally evaluate all of the missing angle measures in each figure.

Figure A

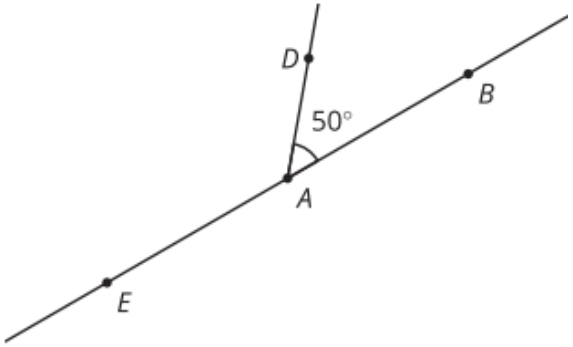


Figure B

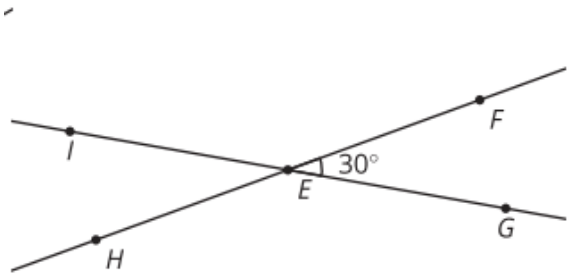


Figure C

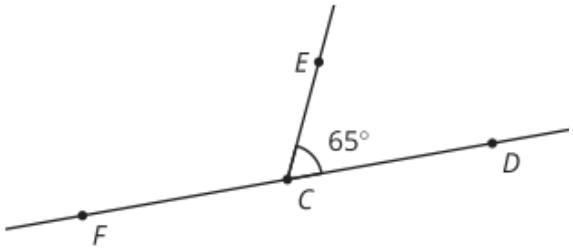
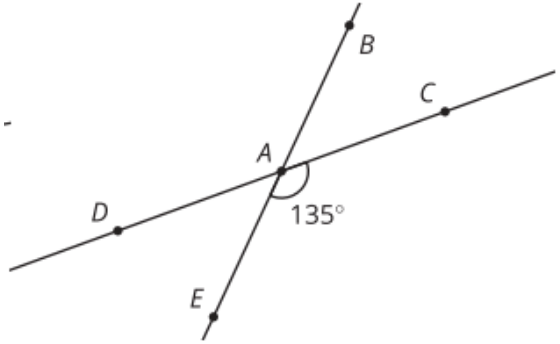


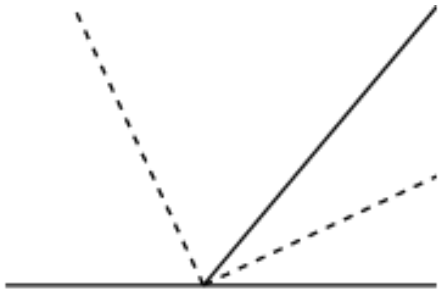
Figure D

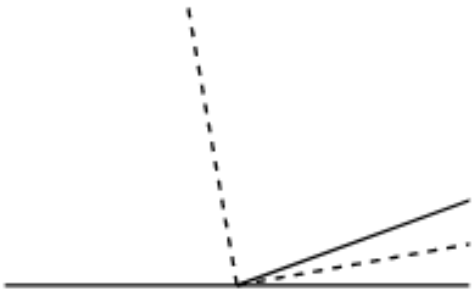


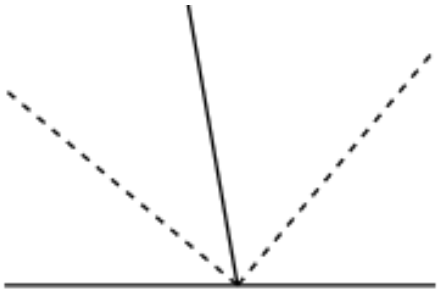
That Can't Be Right, Can It?

Notice and Wonder

What do you notice? What do you wonder?



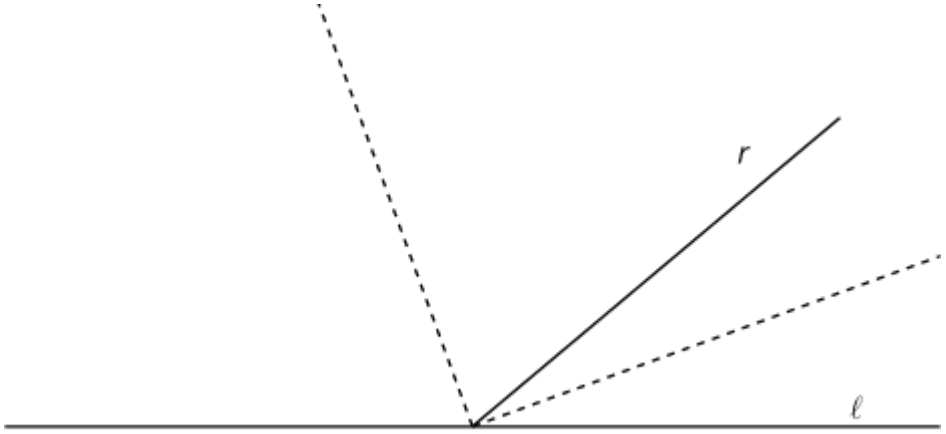




That Can't Be Right, Can It?

Here is a figure where ray r meets line l. The dashed rays are angle bisectors.

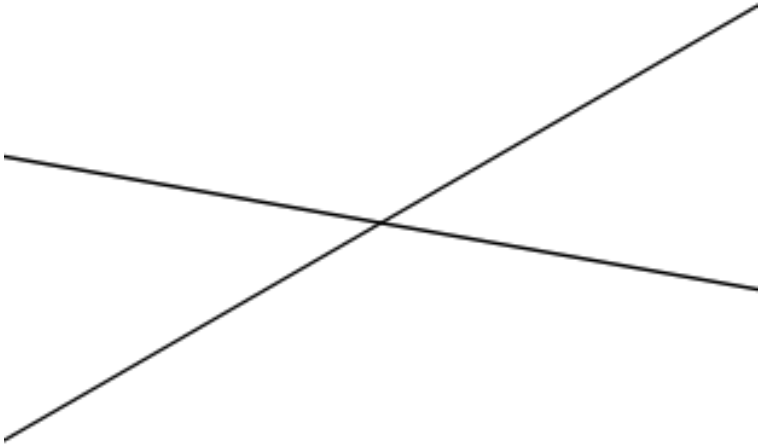
1. Diego made the conjecture: "The angle formed between the angle bisectors is always a right angle, no matter what the angle between r and l is." It is difficult to tell specifically which angles Diego is talking about in his conjecture. Label the diagram and rephrase Diego's conjecture more precisely using your labels.
2. Is the conjecture true? Explain your reasoning.



Convince Me

Here are 2 intersecting lines that create 2 pairs of vertical angles:

1. What is the relationship between vertical angles? Write down a conjecture. Label the diagram to make it easier to write your conjecture precisely.
2. How do you know your conjecture is true for all possible pairs of vertical angles? Explain your reasoning.

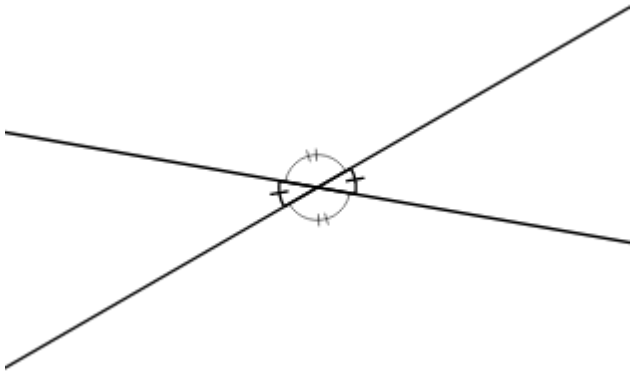


Lesson Synthesis

- Which argument makes more sense to you, rigid transformations that take one vertical angle onto the other, or using straight angles to look at 180 degree sums?
- What is the difference between angle and angle measure?

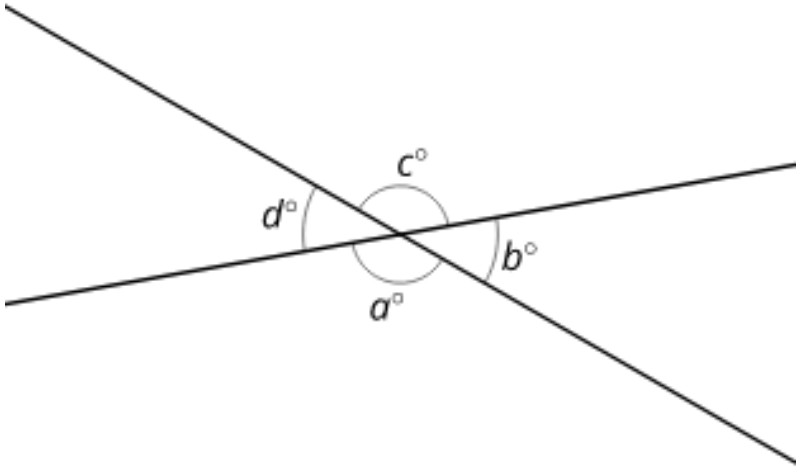
Ask students to add this theorem to their reference charts as you add it to the class reference chart:

Vertical angles are congruent.



Plead Your Case

Cool-down



Give the most convincing explanation you can for why $a = c$.

- I can label and make conjectures from diagrams.
- I can prove vertical angles are congruent.

Learning Targets

Geometry