Mirror, Mirror   *E004 scoring rubric*

Math Domain

☐	Number/Quantity	✓	Shape/Space	☐	Function/Pattern
☐	Chance/Data	✓	Arrangement		

**Math Actions** (possible weights: 0 through 4)

1	Modeling/Formulating	2	Manipulating/Transforming
2	Inferring/Drawing Conclusions	1	Communicating

Math Big Ideas

☐	Scale	☐	Reference Frame	☐	Representation
☐	Continuity	☐	Boundedness	✓	Invariance/Symmetry
☐	Equivalence	☐	General/Particular	☐	Contradiction
☐	Use of Limits	☐	Approximation	☐	Other

The intent of this task is to have students demonstrate their understanding of rotation and reflection symmetry.

1. Two conditions are necessary for the image in the mirror to be identical to the part that is covered by it; each side or each part of a side covered by the mirror must be equal in length to the corresponding side or part of a side in front of the mirror.
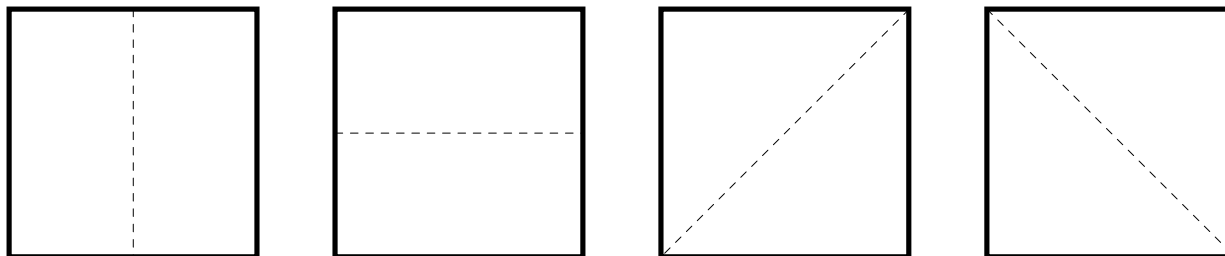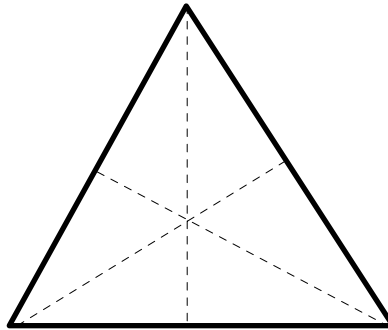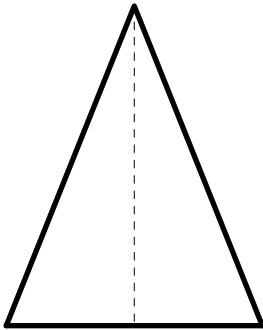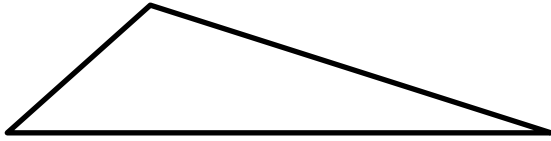

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 Given this condition there are three possible correct answers:

    a. The mirror goes through the centers of opposite sides or through opposite corners (2 ways)

    b. The mirror is positioned horizontally, vertically, and along the two diagonals (4 ways)

    c. If the mirror is double-faced, in each of the above positions the mirror can face in two directions.(8 ways)

2. Given a random scalene triangle, there is **no** position of the mirror which will duplicate the entire triangle. If the chosen triangle is isosceles there are either one or two positions, depending on whether changing the direction of the mirror face can be considered. If the chosen triangle is equilateral, there are either three or six positions

------------------------ mirror

	partial level	**full level**
Modeling/ Formulating (weight: 1)	Devise a model which retains all linear measurements.	Recognize that the lengths in the mirror are the same as the lengths in the original, **and** make some symmetry argument.
Transforming/ Manipulating (weight: 2)	Provide a descriptive justification for the chosen position of the mirror.	Identify at least two different kinds of triangles **in 2**.
Inferring/ Drawing Conclusions (weight: 2)	See one symmetry in the square and/or one symmetry in the triangles (provided a scalene triangle is not drawn)	See two or more symmetries in squares and equilateral triangles.
Communicating (weight: 1)	Provide clear, correct diagrams of the various mirror positions.	Additionally, provide clear prose where necessary and be able to articulate a consistent argument.