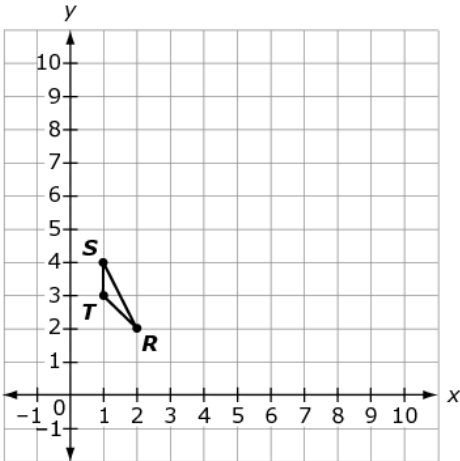| MAFS.912.G-CO.1.2	Represent transformations in the plane using, e.g., transparencies and geometry software; describe transformations as functions that take points in the plane as inputs and give other points as outputs. Compare transformations that preserve distance and angle to those that do not (e.g., translation versus horizontal stretch).
Also assesses MAFS.912.G-CO.1.4	Develop definitions of rotations, reflections, and translations in terms of angles, circles, perpendicular lines, parallel lines, and line segments.
Item Types	Editing Task Choice – May require choosing a definition of rotation, reflection, or translation from an informal or formal geometric argument.
	Equation Editor – May require entering the *x*-coordinate or *y*-coordinate.
	Hot Text – May require completing a table.
	GRID – May require constructing transformations, mapping vertices to each other, or graphing a figure or a line of reflection.
	Multiple Choice – May require selecting a value or an expression from a list.
	Multiselect – May require selecting responses.
	Open Response – May require explaining the differences and similarities between different transformations.
	Table Item – May require completing a table of values.
Clarifications	Students will represent transformations in the plane.
	Students will describe transformations as functions that take points in the plane as inputs and give other points as outputs.
	Students will compare transformations that preserve distance and angle to those that do not.
	Students will use definitions of rotations, reflections, and translations in terms of angles, circles, perpendicular lines, parallel lines, and line segments.
Assessment Limits	Items may require the student to be familiar with using the algebraic description $(x, y) \rightarrow (x + a, y + b)$ for a translation, and $(x, y) \rightarrow (kx, ky)$ for a dilation when given the center of dilation. Items may require the student to be familiar with the algebraic description for a 90-degree rotation about the origin, $(x, y) \rightarrow (-y, x)$, for a 180-degree rotation about the origin, $(x, y) \rightarrow (-x, -y)$, and for a 270-degree rotation about the origin, $(x, y) \rightarrow (y, -x)$. Items that use more than one transformation may ask the student to write a series of algebraic descriptions.
	Items must not use matrices to describe transformations.

	Items must not require the student to use the distance formula.
	Items may require the student to find the distance between two points or the slope of a line.
	In items that require the student to represent transformations, at least two transformations should be applied.
Stimulus Attributes	Items may be set in real-world or mathematical context.
	Items may ask the student to determine if a transformation is rigid.
	Items may ask the student to determine if steps that are given can be used to develop a definition of an angle, a circle, perpendicular lines, parallel lines, or line segments by using rotations, reflections, and translations.
Response Attributes	Items may require the student to give a coordinate of a transformed figure.
	Items may require the student to use a function, e.g., $y = k(f(x+a))+b$, to describe a transformation.
	Items may require the student to determine if a verbal description of a definition is valid.
	Items may require the student to determine any flaws in a verbal description of a definition.
	Items may require the student to be familiar with slope-intercept form of a line, standard form of a line, and point-slope form of a line.
	Items may require the student to give a line of reflection and/or a degree of rotation that carries a figure onto itself.
	Items may require the student to draw a figure using a description of a translation.
Calculator	Neutral

Sample Item	Item Type
	Editing Task Choice

Triangle *SRT* is shown.

There are three highlights in the paragraph that show equations or phrases that are missing. For each highlight, click on the correct equation or phrase.

The vertices of △*SRT* are *S* (1, 4), *R* (2, 2), and *T* (1, 3). A reflection across the line __?__ and then across the line __?__ is the same as a translation of 4 units to the right and 4 units up because the lines are __?__ .