

Similarity

5.1 Use dilations to show figures similar

| | 4 – Mastery | 3 – Proficient | 2 - Basic | 1 – Below Basic | 0 – No Evidence |
|--|--|--|---|---|--|
| <p>Properties of Dilations (G.SRT.1)</p> <p>Explain similarity (G.SRT.2)</p> | <p>Can extend thinking beyond the standard, including tasks that may involve one of the following:</p> <ul style="list-style-type: none"> • Designing • Connecting • Synthesizing • Applying • Justifying • Critiquing • Analyzing • Creating • Proving | <p>Verify that when a side passes through the center of dilation, <u>the side and its image lie on the same line.</u></p> <p>Verify that corresponding sides of the pre-image and images are <u>parallel and</u> proportional after dilation.</p> <p>Explain <u>using transformations</u> if two figures are similar by verifying</p> <ul style="list-style-type: none"> • corresponding angles are congruent • corresponding sides are proportional | <p>Given an image and the pre-image, <u>determine the center of dilation</u></p> <p>Verify that corresponding sides of the pre-image and images are <u>proportional by finding the scale factor.</u></p> <p>Explain if two figures are similar by verifying</p> <ul style="list-style-type: none"> • corresponding angles are congruent • corresponding sides are proportional | <p>Perform dilation with a given center and scale factor on a figure in the coordinate plane.</p> <p>Show mathematically if two figures are similar by verifying</p> <ul style="list-style-type: none"> • corresponding angles are congruent • corresponding sides are proportional | <p>Little evidence of reasoning or application to solve the problem</p> <p>Does not meet the criteria in a level 1</p> |

G.SRT.1 Verify experimentally the properties of dilations given by a center and a scale factor:

- dilation takes a line not passing through the center of the dilation to a parallel line, and leaves a line passing through the center unchanged.
- the dilation of a line segment is longer or shorter in the ratio given by the scale factor.

G.SRT.2 Given two figures, use the definition of similarity in terms of similarity transformations to decide if they are similar; explain using similarity transformations the meaning of similarity for triangles as the equality of all corresponding pairs of angles and the proportionality of all corresponding pairs of sides.

Similarity

5.2 Explain and prove similarity theorems

| | 4 – Mastery | 3 – Proficient | 2 - Basic | 1 – Below Basic | 0 – No Evidence |
|--|---|--|--|--|--|
| Prove similar triangles (G.SRT.3) | Can extend thinking beyond the standard, including tasks that may involve one of the following: <ul style="list-style-type: none"> • Designing • Connecting • Synthesizing • Applying • Justifying • Critiquing • Analyzing • Creating • Proving | <ul style="list-style-type: none"> • Use AA~ to formally prove triangles similar (two-column, paragraph, etc). | <ul style="list-style-type: none"> • Prove AA~ using transformations. | Identify if triangles are similar by: <ul style="list-style-type: none"> • AA~ • SAS~ • SSS~ | Little evidence of reasoning or application to solve the problem |
| Solve and prove relationships (G.SRT.5, G.MG.3) | | Solve and prove real world geometric problems using congruence and similarity | Solve real world geometric problems using congruence and similarity | Solve mathematical geometric problems using congruence and similarity | Does not meet the criteria in a level 1 |
| Prove triangle theorems (G.SRT.4, G.CO.10) | | Prove all of the following theorems: <ul style="list-style-type: none"> • a line parallel to one side of a triangle divides the other two proportionally • if a line divides two sides of a triangle proportionally; then it is parallel to the third side. • Pythagorean Theorem proved using triangle similarity | Prove 2 of the following theorems: <ul style="list-style-type: none"> • a line parallel to one side of a triangle divides the other two proportionally • if a line divides two sides of a triangle proportionally; then it is parallel to the third side. • Pythagorean Theorem proved using triangle similarity | Prove 1 of the following theorems: <ul style="list-style-type: none"> • a line parallel to one side of a triangle divides the other two proportionally • if a line divides two sides of a triangle proportionally; then it is parallel to the third side. • Pythagorean Theorem proved using triangle similarity | |

G.SRT.3 Use the properties of similarity transformations to establish the AA criterion for two triangles to be similar.

G.SRT.5 Use congruence and similarity criteria for triangles to solve problems and to prove relationships in geometric figures.

G.SRT.4 Prove theorems about triangles. Theorems include: a line parallel to one side of a triangle divides the other two proportionally, and conversely; the Pythagorean Theorem proved using triangle similarity.

G.CO.10 Prove theorems about triangles. Theorems include: ~~measures of interior angles of a triangle sum to 180°; base angles of isosceles triangles are congruent; the segment joining midpoints of two sides of a triangle is parallel to the third side and half the length; the medians of a triangle meet at a point.~~

G.MG.3 Apply geometric methods to solve design problems (e.g., designing an object or structure to satisfy physical constraints or minimize cost; working with typographic grid systems based on ratios). ★

Similarity

5.3 Apply similarity theorems (Extension – Honors Only)

| | 4 – Mastery | 3 – Proficient | 2 - Basic | 1 – Below Basic | 0 – No Evidence |
|--|---|--|--|--|--|
| Solve and prove relationships (G.SRT.5) | Can extend thinking beyond the standard, including tasks that may involve one of the following: | Solve and prove geometric problems using congruence and similarity | Solve geometric problems using congruence and similarity | Solve geometric problems using congruence or similarity | Little evidence of reasoning or application to solve the problem |
| Explain similarity (G.SRT.2) | <ul style="list-style-type: none"> • Designing • Connecting • Synthesizing • Applying • Justifying • Critiquing • Analyzing • Creating • Proving | <p>Verify that corresponding sides of the pre-image and images are parallel and proportional after dilation.</p> <p>Explain using transformations if two figures are similar by verifying</p> <ul style="list-style-type: none"> • corresponding angles are congruent • corresponding sides are proportional | <p>Verify that corresponding sides of the pre-image and images are proportional by finding the scale factor.</p> <p>Explain if two figures are similar by verifying</p> <ul style="list-style-type: none"> • corresponding angles are congruent • corresponding sides are proportional | <p>Show mathematically if two figures are similar by verifying</p> <ul style="list-style-type: none"> • corresponding angles are congruent • corresponding sides are proportional | Does not meet the criteria in a level 1 |

G.SRT.5 Use congruence and similarity criteria for triangles to solve problems and to prove relationships in geometric figures.

G.SRT.2 Given two figures, use the definition of similarity in terms of similarity transformations to decide if they are similar; explain using similarity transformations the meaning of similarity for triangles as the equality of all corresponding pairs of angles and the proportionality of all corresponding pairs of sides.