

## Performance Level Descriptors – Geometry

	<b>Geometry: Sub-Claim A</b>			
	The student solves problems involving the Major Content for the grade/course with connections to the Standards for Mathematical Practice.			
	<b>Level 5: Distinguished Command</b>	<b>Level 4: Strong Command</b>	<b>Level 3: Moderate Command</b>	<b>Level 2: Partial Command</b>
<b>Congruence Transformations</b>  G-CO.6 G-CO.C	Determines and uses appropriate geometric theorems and properties of rigid motions, lines, angles, triangles and parallelograms to solve <b>non-routine</b> problems and prove statements about angle measurement, triangles, distance, line properties and congruence.	<b>Determines and</b> uses <b>appropriate</b> geometric theorems and properties of rigid motions, lines, angles, triangles and parallelograms to solve routine problems and prove statements about angle measurement, triangles, distance, line properties and congruence.	Uses given geometric theorems and properties of rigid motions, lines, angles, triangles and parallelograms to solve routine problems and <b>prove statements</b> about angle measurement, triangles, distance, line properties and congruence.	Uses given geometric theorems and properties of rigid motions, lines, angles, triangles and parallelograms to solve routine problems and reason about angle measurement, triangles, distance, line properties and congruence.
<b>Similarity</b>  G-SRT.1a G-SRT.1b G-SRT.2 G-SRT.5	Uses transformations and congruence and similarity criteria for triangles and to prove relationships among <b>composite</b> geometric figures and to solve <b>multi-step</b> problems.	Uses transformations <b>and congruence and similarity criteria for triangles to prove</b> relationships among geometric figures and to solve problems.	<b>Uses</b> transformations to <b>determine</b> relationships among geometric figures <b>and to solve problems.</b>	Identifies transformation relationships in geometric figures.
<b>Similarity in Trigonometry</b>  G-SRT.6 G-SRT.7-2 G-SRT.8	Uses trigonometric ratios, the Pythagorean Theorem and the relationship between sine and cosine to solve right triangles in applied <b>non-routine</b> problems.  Uses similarity transformations with right	Uses trigonometric ratios, the Pythagorean Theorem and the relationship between sine and cosine to solve right triangles in applied problems.  <b>Uses similarity transformations with right triangles to define</b>	Uses trigonometric ratios, the Pythagorean Theorem <b>and the relationship between sine and cosine to solve right triangles in applied problems.</b>	Uses trigonometric ratios and the Pythagorean Theorem to determine the unknown side lengths and angle measurements of a right triangle.

## Performance Level Descriptors – Geometry

	<b>Geometry: Sub-Claim A</b>			
	The student solves problems involving the Major Content for the grade/course with connections to the Standards for Mathematical Practice.			
	<b>Level 5: Distinguished Command</b>	<b>Level 4: Strong Command</b>	<b>Level 3: Moderate Command</b>	<b>Level 2: Partial Command</b>
	triangles to define trigonometric ratios for acute angles.	<b>trigonometric ratios for acute angles.</b>		
<b>Modeling and Applying</b>  G-SRT.7-2 G-SRT.8 G-GPE.6 G-Int.1	Uses geometric relationships in the coordinate plane to solve problems involving area, perimeter and ratios of lengths.  Applies geometric concepts and trigonometric ratios to describe, model and solve applied problems ( <b>including design problems</b> ) related to the Pythagorean theorem, density, geometric shapes, their measures and properties.	Uses geometric relationships in the coordinate plane to solve problems involving area, perimeter and ratios of lengths.  Applies geometric concepts <b>and trigonometric ratios</b> to describe, model and solve applied problems related to the Pythagorean theorem, <b>density</b> , geometric shapes, their measures and properties.	Uses geometric relationships in the coordinate plane to solve problems involving area, perimeter <b>and ratios of lengths.</b>  Applies geometric concepts to describe, model and solve applied problems related to the Pythagorean theorem, geometric shapes, their measures and properties.	Uses provided geometric relationships in the coordinate plane to solve problems involving area and perimeter.  Applies geometric concepts to describe, model and solve applied problems related to the Pythagorean theorem, geometric shapes, their measures and properties.

## Performance Level Descriptors – Geometry

	<b>Geometry: Sub-Claim B</b>			
	The student solves problems involving the Additional and Supporting Content for the grade/course with connections to the Standards for Mathematical Practice.			
	<b>Level 5: Distinguished Command</b>	<b>Level 4: Strong Command</b>	<b>Level 3: Moderate Command</b>	<b>Level 2: Partial Command</b>
<b>Transformations</b>  G-CO.1 G-CO.3 G-CO.5	<p>Given a figure and a <b>sequence of transformations</b>, draws the transformed figure.</p> <p>Uses precise geometric terminology to specify <b>more than one</b> sequence of transformations that will carry a figure onto itself or another.</p>	<p>Given a figure and a transformation, draws the transformed figure.</p> <p><b>Uses precise geometric terminology to specify</b> a sequence of transformations that will carry a figure onto <b>itself or</b> another.</p>	<p>Given a figure and a transformation, draws the transformed figure.</p> <p><b>Specifies a sequence of transformations that will carry a figure onto another.</b></p>	<p>Given a figure and a transformation, draws the transformed figure.</p>
<b>Geometric Constructions</b>  G-CO.D	<p>Makes geometric constructions: copying a segment, copying an angle, bisecting an angle, bisecting a segment, including the perpendicular bisector of a line segment.</p> <p>Given a line and a point not on the line, uses a variety of tools and methods to construct perpendicular and parallel lines, equilateral triangles, squares and regular hexagons inscribed in circles <b>to prove geometric theorems.</b></p>	<p>Makes geometric constructions: copying a segment, copying an angle, bisecting an angle, bisecting a segment, including the perpendicular bisector of a line segment.</p> <p>Given a line and a point not on the line, <b>uses a variety of tools and methods</b> to construct perpendicular and parallel lines, <b>equilateral triangles, squares and regular hexagons inscribed in circles.</b></p>	<p>Makes geometric constructions: copying a segment, copying an angle, bisecting an angle, bisecting a segment, including the perpendicular bisector of a line segment.</p> <p><b>Given a line and a point not on the line, constructs perpendicular and parallel lines.</b></p>	<p>Makes basic geometric constructions: copying a segment, copying an angle, bisecting an angle, bisecting a segment, including the perpendicular bisector of a line segment.</p>

## Performance Level Descriptors – Geometry

	<b>Geometry: Sub-Claim B</b>			
	The student solves problems involving the Additional and Supporting Content for the grade/course with connections to the Standards for Mathematical Practice.			
	<b>Level 5: Distinguished Command</b>	<b>Level 4: Strong Command</b>	<b>Level 3: Moderate Command</b>	<b>Level 2: Partial Command</b>
<p><b>Applying Geometric Properties and Theorems</b></p> <p>G-C.A.Int.1 G-C.B.Int.1 G-GPE.1-2</p>	<p>Applies properties and theorems of angles, segments and arcs in circles to solve problems, model relationships <b>and formulate generalizations.</b></p> <p>Completes the square to find the center and radius of a circle given by an equation.</p>	<p>Applies properties and theorems of angles, segments and arcs in circles to solve problems <b>and model relationships.</b></p> <p>Completes the square to find the center and radius of a circle given by an equation.</p>	<p>Applies properties and theorems of angles, segments and arcs in circles to solve problems.</p> <p><b>Completes the square to find the center and radius of a circle given by an equation.</b></p>	<p>Applies provided properties and theorems of angles, segments and arcs in circles to solve problems.</p>
<p><b>Geometric Formulas</b></p> <p>G-GMD.1 G-GMD.3 G-GMD.4</p>	<p>Uses volume formulas to solve mathematical and contextual problems that involve cylinders, pyramids, cones and spheres.</p> <p>Uses dissection arguments, <b>Cavalieri’s principle and informal limit arguments to support</b> the formula for the circumference of a circle, area of a circle, volume of a cylinder, <b>pyramid and cone.</b></p> <p>Identifies the shapes of two-dimensional cross-sections of three-dimensional</p>	<p><b>Uses volume formulas to solve mathematical and contextual problems that involve cylinders, pyramids, cones and spheres.</b></p> <p>Gives an informal argument for the formula for the circumference of a circle, area of a circle and <b>volume of a cylinder</b>, including dissection arguments.</p> <p>Identifies the shapes of two-dimensional cross-sections of three-dimensional objects <b>and identifies</b></p>	<p>Using formulas, determines the volume of cylinders, pyramids, cones and spheres.</p> <p><b>Gives an informal argument for the formula for the circumference of a circle and area of a circle, including dissection arguments.</b></p> <p>Identifies the shapes of two-dimensional cross-sections of three-dimensional objects.</p>	<p>Using formulas, determines the volume of cylinders, pyramids, cones and spheres.</p> <p>Identifies the shapes of two-dimensional cross-sections of three-dimensional objects.</p>

## Performance Level Descriptors – Geometry

	<b>Geometry: Sub-Claim B</b>			
	The student solves problems involving the Additional and Supporting Content for the grade/course with connections to the Standards for Mathematical Practice.			
	<b>Level 5: Distinguished Command</b>	<b>Level 4: Strong Command</b>	<b>Level 3: Moderate Command</b>	<b>Level 2: Partial Command</b>
	objects and identifies three-dimensional objects generated by rotations of two-dimensional objects.	<b>three-dimensional objects generated by rotations of two-dimensional objects.</b>		

## Performance Level Descriptors – Geometry

	<b>Geometry: Sub-Claim C</b>			
	The student expresses course-level appropriate mathematical reasoning by constructing viable arguments, critiquing the reasoning of others and/or attending to precision when making mathematical statements.			
	<b>Level 5: Distinguished Command</b>	<b>Level 4: Strong Command</b>	<b>Level 3: Moderate Command</b>	<b>Level 2: Partial Command</b>
<b>Reasoning</b>  HS.C.13.1 HS.C.13.2 HS.C.13.3 HS.C.14.1 HS.C.14.2 HS.C.14.3 HS.C.14.5 HS.C.14.6 HS.C.15.14 HS.C.18.2	Clearly constructs and communicates a complete response based on: <ul style="list-style-type: none"> <li>• a chain of reasoning to justify or refute algebraic and/or geometric propositions or conjectures</li> <li>• geometric reasoning in a coordinate setting, OR</li> <li>• a response to a multi-step problem,</li> </ul> by: <ul style="list-style-type: none"> <li>• using a logical approach based on a conjecture and/or stated assumptions, utilizing mathematical connections (when appropriate)</li> <li>• providing an <b>efficient and</b> logical progression of steps or chain of reasoning with appropriate justification</li> </ul>	Clearly constructs and communicates a complete response based on: <ul style="list-style-type: none"> <li>• a chain of reasoning to justify or refute algebraic and/or geometric propositions or conjectures</li> <li>• geometric reasoning in a coordinate setting, OR</li> <li>• a response to a multi-step problem,</li> </ul> by: <ul style="list-style-type: none"> <li>• using a logical approach based on a conjecture and/or stated assumptions, <b>utilizing mathematical connections (when appropriate)</b></li> <li>• providing a <b>logical</b> progression of steps or chain of reasoning <b>with appropriate justification</b></li> </ul>	Constructs and communicates a response based on: <ul style="list-style-type: none"> <li>• a chain of reasoning to justify or refute algebraic and/or geometric propositions or conjectures</li> <li>• geometric reasoning in a coordinate setting, OR</li> <li>• a response to a multi-step problem,</li> </ul> by: <ul style="list-style-type: none"> <li>• using a <b>logical</b> approach based on a conjecture and/or stated assumptions</li> <li>• providing a <b>logical, but incomplete,</b> progression of steps or chain of reasoning</li> <li>• <b>performing minor</b> calculation errors</li> <li>• using <b>some</b> grade-level vocabulary, symbols</li> </ul>	Constructs and communicates an incomplete response based on: <ul style="list-style-type: none"> <li>• a chain of reasoning to justify or refute algebraic and/or geometric propositions or conjectures</li> <li>• geometric reasoning in a coordinate setting, OR</li> <li>• a response to a multi-step problem,</li> </ul> by : <ul style="list-style-type: none"> <li>• using an approach based on a conjecture and/or stated or faulty assumptions</li> <li>• providing an incomplete or illogical chain of reasoning, or progression of steps</li> <li>• making an intrusive calculation error</li> <li>• using limited grade-level vocabulary,</li> </ul>

## Performance Level Descriptors – Geometry

<b>Geometry: Sub-Claim C</b>				
The student expresses course-level appropriate mathematical reasoning by constructing viable arguments, critiquing the reasoning of others and/or attending to precision when making mathematical statements.				
	<b>Level 5: Distinguished Command</b>	<b>Level 4: Strong Command</b>	<b>Level 3: Moderate Command</b>	<b>Level 2: Partial Command</b>
	<ul style="list-style-type: none"> <li>performing precise calculations</li> <li>using correct grade-level vocabulary, symbols and labels</li> <li>providing a justification of a conclusion</li> <li><b>determining whether an argument or conclusion is generalizable</b></li> <li>evaluating, interpreting and critiquing the validity <b>and efficiency</b> of others' responses, approaches and reasoning – utilizing mathematical connections (when appropriate) – and <b>providing a counter-example where applicable</b></li> </ul>	<ul style="list-style-type: none"> <li><b>performing precise calculations</b></li> <li>using <b>correct</b> grade-level vocabulary, symbols and labels</li> <li>providing a <b>justification</b> of a conclusion</li> <li><b>evaluating, interpreting and critiquing the validity of others' responses, approaches and reasoning – utilizing mathematical connections (when appropriate)</b></li> </ul>	and labels <ul style="list-style-type: none"> <li>providing a partial justification of a conclusion based on own calculations</li> <li><b>evaluating the validity of others' approaches and conclusions</b></li> </ul>	symbols and labels <ul style="list-style-type: none"> <li>providing a partial justification of a conclusion based on own calculations</li> </ul>

## Performance Level Descriptors – Geometry

<b>Geometry: Sub-Claim D</b> The student solves real-world problems with a degree of difficulty appropriate to the grade/course by applying knowledge and skills articulated in the standards for the current grade/course (or for more complex problems, knowledge and skills articulated in the standards for previous grades/courses), engaging particularly in the Modeling practice, and where helpful making sense of problems and persevering to solve them, reasoning abstractly, and quantitatively, using appropriate tools strategically, looking for the making use of structure and/or looking for and expressing regularity in repeated reasoning.				
	Level 5: Distinguished Command	Level 4: Strong Command	Level 3: Moderate Command	Level 2: Partial Command
<b>Modeling</b>  HS.D.1-2 HS.D.2-1 HS.D.2-2 HS.D.2-11 HS.D.3-2 HS.D.3-4	Devises and enacts a plan to apply mathematics in solving problems arising in everyday life, society and the workplace by: <ul style="list-style-type: none"> <li>• using stated assumptions and making assumptions and approximations to simplify a real-world situation (includes micro-models)</li> <li>• mapping relationships between important quantities</li> <li>• selecting appropriate tools to create models</li> <li>• analyzing relationships mathematically between important quantities to draw conclusion</li> <li>• <b>analyzing and/or</b></li> </ul>	Devises and enacts a plan to apply mathematics in solving problems arising in everyday life, society and the workplace by: <ul style="list-style-type: none"> <li>• using stated assumptions <b>and making assumptions</b> and approximations to simplify a real-world situation (<b>includes micro-models</b>)</li> <li>• <b>mapping relationships between</b> important quantities</li> <li>• <b>selecting appropriate</b> tools to create models</li> <li>• analyzing relationships mathematically between important quantities to draw conclusions</li> </ul>	Devises and enacts a plan to apply mathematics in solving problems arising in everyday life, society and the workplace by: <ul style="list-style-type: none"> <li>• using stated assumptions and approximations to simplify a real-world situation</li> <li>• <b>illustrating relationships between</b> important quantities</li> <li>• using provided tools to create models</li> <li>• analyzing relationships mathematically <b>between important quantities</b> to draw conclusions</li> </ul>	Devises a plan to apply mathematics in solving problems arising in everyday life, society and the workplace by: <ul style="list-style-type: none"> <li>• using stated assumptions and approximations to simplify a real-world situation</li> <li>• identifying important quantities</li> <li>• using provided tools to create models</li> <li>• analyzing relationships mathematically to draw conclusions</li> <li>• writing an algebraic expression or equation to describe a situation</li> <li>• applying proportional reasoning and percentages</li> </ul>

## Performance Level Descriptors – Geometry

<b>Geometry: Sub-Claim D</b> The student solves real-world problems with a degree of difficulty appropriate to the grade/course by applying knowledge and skills articulated in the standards for the current grade/course (or for more complex problems, knowledge and skills articulated in the standards for previous grades/courses), engaging particularly in the Modeling practice, and where helpful making sense of problems and persevering to solve them, reasoning abstractly, and quantitatively, using appropriate tools strategically, looking for the making use of structure and/or looking for and expressing regularity in repeated reasoning.				
Level 5: Distinguished Command	Level 4: Strong Command	Level 3: Moderate Command	Level 2: Partial Command	
<p><b>creating constraints, relationships and goals</b></p> <ul style="list-style-type: none"> <li>• interpreting mathematical results in the context of the situation</li> <li>• reflecting on whether the results make sense</li> <li>• improving the model if it has not served its purpose</li> <li>• writing a complete, clear and correct algebraic expression or equation to describe a situation</li> <li>• applying proportional reasoning and percentages <b>justifying and defending models which lead to a conclusion</b></li> <li>• applying geometric principles and theorems</li> </ul>	<ul style="list-style-type: none"> <li>• interpreting mathematical results <b>in the context of the situation</b></li> <li>• reflecting on whether the results make sense</li> <li>• <b>improving</b> the model if it has not served its purpose</li> <li>• writing a <b>complete, clear and correct</b> algebraic expression or equation to describe a situation</li> <li>• applying proportional reasoning and percentages</li> <li>• applying geometric principles and theorems</li> <li>• writing and using functions <b>in any form</b> to describe how one quantity of interest depends on another</li> </ul>	<ul style="list-style-type: none"> <li>• <b>interpreting mathematical results in a simplified context</b></li> <li>• <b>reflecting on whether the results make sense</b></li> <li>• <b>modifying the model if it has not served its purpose</b></li> <li>• writing an algebraic expression or equation to describe a situation</li> <li>• applying proportional reasoning and percentages</li> <li>• applying geometric principles and theorems</li> <li>• <b>writing and</b> using functions to describe how one quantity of interest depends on another</li> <li>• using statistics</li> <li>• using <b>reasonable</b> estimates of known</li> </ul>	<ul style="list-style-type: none"> <li>• applying common geometric principles and theorems</li> <li>• using functions to describe how one quantity of interest depends on another</li> <li>• using statistics</li> <li>• using estimates of known quantities in a chain of reasoning that yields an estimate of an unknown quantity</li> </ul>	

## Performance Level Descriptors – Geometry

<b>Geometry: Sub-Claim D</b> The student solves real-world problems with a degree of difficulty appropriate to the grade/course by applying knowledge and skills articulated in the standards for the current grade/course (or for more complex problems, knowledge and skills articulated in the standards for previous grades/courses), engaging particularly in the Modeling practice, and where helpful making sense of problems and persevering to solve them, reasoning abstractly, and quantitatively, using appropriate tools strategically, looking for the making use of structure and/or looking for and expressing regularity in repeated reasoning.				
Level 5: Distinguished Command	Level 4: Strong Command	Level 3: Moderate Command	Level 2: Partial Command	
<ul style="list-style-type: none"> <li>• writing and using functions <b>in any form</b> to describe how one quantity of interest depends on another</li> <li>• using statistics</li> <li>• using reasonable estimates of known quantities in a chain of reasoning that yields an estimate of an unknown quantity</li> </ul>	<ul style="list-style-type: none"> <li>• using statistics</li> <li>• using reasonable estimates of known quantities in a chain of reasoning that yields an estimate of an unknown quantity</li> </ul>	quantities in a chain of reasoning that yields an estimate of an unknown quantity		