



Informational Guide
to
Geometry Summative
Assessments

Overview

The PARCC assessment system is a cohesive set of tests that students will take during the school year that include summative (performance-based and end-of-year assessments) and non-summative components (diagnostic and mid-year assessments). This guide has been prepared to provide specific information about the PARCC Summative Assessments. The PARCC Assessments are based upon Evidence-Centered Design (ECD). Evidence-Centered Design is a systematic approach to test development. The design work begins with developing **claims** (the inferences we want to draw about what students know and can do). Next, **evidence statements** are developed to describe the tangible things we could point to, highlight or underline in a student work product that would help us prove our claims. Then, **tasks** are designed to elicit this tangible evidence.

This guide provides information on the following for the Geometry Summative Assessments:

- PARCC Claims Structure
- PARCC Task Types
- PARCC Test Blueprint
- PARCC Evidence Statements and Tables[◇]
- PARCC Assessment Policies

[◇]The Evidence Tables in this document are formatted to assist educators in understanding the content of each summative assessment. Evidence Statements are grouped to indicate those assessable on the PBA only, both the PBA and EOY, and the EOY only.

Claims Structure: Geometry

Master Claim: On-Track for college and career readiness. The degree to which a student is college and career ready (or “on-track” to being ready) in mathematics. The student solves grade-level /course-level problems in mathematics as set forth in the Standards for Mathematical Content with connections to the Standards for Mathematical Practice.

Sub-Claim A: Major Content¹ with Connections to Practices

The student solves problems involving the Major Content¹ for her grade/course with connections to the Standards for Mathematical Practice.

39 points³

Sub-Claim B: Additional & Supporting Content² with Connections to Practices

The student solves problems involving the Additional and Supporting Content² for her grade/course with connections to the Standards for Mathematical Practice.

26 points

Sub-Claim C: Highlighted Practices MP.3,6 with Connections to Content (expressing mathematical reasoning)

The student expresses grade/course-level appropriate mathematical reasoning by constructing viable arguments, critiquing the reasoning of others, and/or attending to precision when making mathematical statements.

14 points

Sub-Claim D: Highlighted Practice MP.4 with Connections to Content (modeling/application)

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 (MP. 1), reasoning abstractly and quantitatively (MP. 2), using appropriate tools strategically (MP.5), looking for and making use of structure (MP.7), and/or looking for and expressing regularity in repeated reasoning (MP.8).

18 points

Total Exam:

97 points

¹ For the purposes of the PARCC Mathematics assessments, the Major Content in a grade/course is determined by that grade level’s Major Clusters as identified in the *PARCC Model Content Frameworks v.3.0* for Mathematics. Note that tasks on PARCC assessments providing evidence for this claim will sometimes require the student to apply the knowledge, skills, and understandings from across several Major Clusters.

² The Additional and Supporting Content in a grade/course is determined by that grade level’s Additional and Supporting Clusters as identified in the *PARCC Model Content Frameworks v.3.0* for Mathematics.

³ There are 8 points from integrated tasks that assess major content and will be reported in Sub-claim A.

Overview of PARCC Mathematics Task Types

Task Type	Description	Reporting Categories	Scoring Method	Mathematical Practice(s)	Summative Assessment
Type I	conceptual understanding, fluency, and application	<p>Sub-Claim A: Solve problems involving the <u>major content</u> for the grade level</p> <p>Sub-Claim B: Solve problems involving the <u>additional and supporting content</u> for the grade level</p>	computer-scored only	can involve any or all practices	EOY and PBA
Type II	written arguments/justifications, critique of reasoning, or precision in mathematical statements	Sub-Claim C: Express mathematical <u>reasoning</u> by constructing mathematical arguments and critiques	computer- and hand-scored tasks	primarily MP.3 and MP.6, but may also involve any of the other practices	PBA only
Type III	modeling/application in a real-world context or scenario	Sub-Claim D: solve real-world problems engaging particularly in the <u>modeling</u> practice	computer- and hand-scored tasks	primarily MP.4, but may also involve any of the other practices	PBA only

Geometry High Level Blueprints

Performance-Based Summative Assessment (PBA)			
	Task Type/ Point Value	Number of Tasks	Total Points
Number and Point Values for each Task Type	Type I 1 Point	10	10
	Type I 2 Point	0	0
	Type II 3 Point	2	6
	Type II 4 Point	2	8
	Type III 3 Point	2	6
	Type III 6 Point	2	12
	Total		18
Percentage of Assessment Points by Task Type	Type I	(10/42)24%	
	Type II	(14/42) 33%	
	Type III	(18/42) 46%	

End-of-Year Summative Assessment (EOY)			
Task Type/ Point Value	Number of Tasks	Total Points	Percent of Test
Type I 1 Point	19	19	35%
Type I 2 Point	12	24	43%
Type I 4 points	3	12	22%
Total	34	55	100%

Evidence Statement Keys

Evidence statements describe the knowledge and skills that an assessment item/task elicits from students. These are derived directly from the Common Core State Standards for Mathematics (the standards), and they highlight the advances of the standards, especially around their focused coherent nature. The evidence statement keys for grades 3 through 8 will begin with the grade number. High school evidence statement keys will begin with “HS” or with the label for a conceptual category. Together, the five different types of evidence statements described below provide the foundation for ensuring that PARCC assesses the full range and depth of the standards which can be downloaded from <http://www.corestandards.org/Math/>.

An Evidence Statement might:

1. Use exact standard language – For example:

- 8.EE.1 - Know and apply the properties of integer exponents to generate equivalent numerical expressions. *For example, $3^2 \times 3^{-5} = 3^{-3} = 1/3^3 = 1/27$.* This example uses the exact language as standard 8.EE.1

2. Be derived by focusing on specific parts of a standard – For example: 8.F.5-1 and 8.F.5-2 were derived from splitting standard 8.F.5:

- 8.F.5-1 Describe qualitatively the functional relationship between two quantities by analyzing a graph (e.g., where the function is increasing or decreasing, linear or nonlinear).
- 8.F.5-2 Sketch a graph that exhibits the qualitative features of a function that has been described verbally.

Together these two evidence statements are standard 8.F.5:

Describe qualitatively the functional relationship between two quantities by analyzing a graph (e.g., where the function is increasing or 2 decreasing, linear or nonlinear). Sketch a graph that exhibits the qualitative features of a function that has been described verbally.

3. Be integrative (Int) – Integrative evidence statements allow for the testing of more than one of the standards on a single item/task without going beyond the standards to create new requirements. An integrative evidence statement might be integrated across all content within a grade/course, all standards in a high school conceptual category, all standards in a domain, or all standards in a cluster. For example:

- **Grade/Course** – **4.Int.2^s** (Integrated across Grade 4)
- **Conceptual Category** – **F.Int.1^s** (Integrated across the Functions Conceptual Category)
- **Domain** – **4.NBT.Int.1^s** (Integrated across the Number and Operations in Base Ten Domain)
- **Cluster** – **3.NF.A.Int.1^s** (Integrated across the Number and Operations – Fractions Domain, Cluster A)

4. Focus on mathematical reasoning— A reasoning evidence statement (keyed with C) will state the type of reasoning that an item/task will require and the content scope from the standard that the item/task will require the student to reason about. For example:

- 3.C.2[§] -- Base explanations/reasoning on the relationship between addition and subtraction or the relationship between multiplication and division.
 - Content Scope: Knowledge and skills are articulated in 3.OA.6
- 7.C.6.1[§] – Construct, autonomously, chains of reasoning that will justify or refute propositions or conjectures.
 - Content Scope: Knowledge and skills are articulated in 7.RP.2

Note: When the focus of the evidence statement is on reasoning, the evidence statement may also require the student to reason about securely held knowledge from a previous grade.

5. Focus on mathematical modeling – A modeling evidence statement (keyed with D) will state the type of modeling that an item/task will require and the content scope from the standard that the item/task will require the student to model about. For example:

- 4.D.2[§] – Solve multi-step contextual problems with degree of difficulty appropriate to Grade 4 requiring application of knowledge and skills articulated in 3.OA.A, 3.OA.8, 3.NBT, and/or 3.MD.

Note: The example 4.D.2 is of an evidence statement in which an item/task aligned to the evidence statement will require the student to model on grade level, using securely held knowledge from a previous grade.

- HS.D.5[§] - Given an equation or system of equations, reason about the number or nature of the solutions.
 - Content scope: A-REI.11, involving any of the function types measured in the standards.

[§] The numbers at the end of the integrated, modeling and reasoning Evidence Statement keys are added for assessment clarification and tracking purposes. For example, 4.Int.2 is the second integrated Evidence Statement in Grade 4.

Geometry Evidence Statements

Listing by PBA only, PBA and EOY, and EOY Only

The PARCC Evidence Statements for Geometry are provided starting on the next page. The list has been organized to indicate whether items designed to align with an Evidence Statement may be used on the Performance-Based Assessment (PBA), the End-of-Year (EOY) Assessment, or on both the PBA and EOY.

Evidence Statements are presented in the order shown below and are color coded:

Lavender – Evidence Statement is applicable to the PBA only.

Peach – Evidence Statement is applicable to both the PBA and EOY.

Aqua – Evidence Statement is applicable to the EOY only.

Geometry Evidence Statements

PBA Only
 PBA and EOY
 EOY Only

Subclaim	Evidence Statement Key	Evidence Statement Text	Clarifications, limits, emphases, and other information intended to ensure appropriate variety in tasks	Relationship to MP	Calculator*
A	G-SRT.6	Understand that by similarity, side ratios in right triangles are properties of the angles in the triangle, leading to definitions of trigonometric ratios for acute angles.	PBA i.) Trigonometric ratios include sine, cosine, and tangent only.	MP.7	Z
C	HS.C.13.1	Apply geometric reasoning in a coordinate setting, and/or use coordinates to draw geometric conclusions. Content scope: G-GPE.6, G-GPE.7	PBA -	MP.3	Y
C	HS.C.13.2	Apply geometric reasoning in a coordinate setting, and/or use coordinates to draw geometric conclusions. Content scope: G-GPE.4	PBA -	MP.3	Y
C	HS.C.13.3	Apply geometric reasoning in a coordinate setting, and/or use coordinates to draw geometric conclusions. Content scope: G-GPE.5	PBA -	MP.3	Y
C	HS.C.14.1	Construct, autonomously, chains of reasoning that will justify or refute geometric propositions or conjectures. Content scope: G-CO.9, G-CO.10	PBA i.) Theorems include, but are not limited to, the examples listed in standards G-CO.9 & G-CO.10.	MP.3	Y
C	HS.C.14.2	Construct, autonomously, chains of reasoning that will justify or refute geometric propositions or conjectures. Content scope: G-CO.A, G-CO.B	PBA -	MP.3	Y
C	HS.C.14.3	Construct, autonomously, chains of reasoning that will justify or refute geometric propositions or conjectures. Content scope: G-CO.D	PBA -	MP.3	Y
C	HS.C.14.5	Construct, autonomously, chains of reasoning that will justify or refute geometric propositions or conjectures. Content scope: G-SRT.A	PBA -	MP.3	Y
C	HS.C.14.6	Construct, autonomously, chains of reasoning that will justify or refute geometric propositions or conjectures. Content scope: G-SRT.B	PBA -	MP.3	Y

Geometry Evidence Statements

PBA Only
 PBA and EOY
 EOY Only

Subclaim	Evidence Statement Key	Evidence Statement Text	Clarifications, limits, emphases, and other information intended to ensure appropriate variety in tasks	Relationship to MP	Calculator*
C	HS.C.15.14	<p>Present solutions to multi-step problems in the form of valid chains of reasoning, using symbols such as equals signs appropriately (for example, rubrics award less than full credit for the presence of nonsense statements such as $1 + 4 = 5 + 7 = 12$, even if the final answer is correct), or identify or describe errors in solutions to multi-step problems and present corrected solutions.</p> <p>Content scope: G-SRT.C</p>	<p>PBA</p> <p>-</p>	MP.3, MP.6	Y
C	HS.C.18.2	<p>Use a combination of algebraic and geometric reasoning to construct, autonomously, chains of reasoning that will justify or refute propositions or conjectures about geometric figures.</p> <p>Content scope: Algebra content from Algebra 1 course; geometry content from the Geometry course PBA.</p>	<p style="text-align: center;">PBA</p> <p>i.) For the Geometry course, we are reaching back to Algebra 1 to help students synthesize across the two subjects.</p>	MP.3, MP.6	Y
D	HS.D.1-2	Solve multi-step contextual problems with degree of difficulty appropriate to the course, requiring application of knowledge and skills articulated in 6.G, 7.G, and/or 8.G.	<p>PBA</p> <p>-</p>	MP.4, may involve MP.1, MP.2, MP.5, MP.7	Y
D	HS.D.2-1	Solve multi-step contextual problems with degree of difficulty appropriate to the course involving perimeter, area, or volume that require solving a quadratic equation.	<p style="text-align: center;">PBA</p> <p>i.) Tasks do not cue students to the type of equation or specific solution method involved in the task.</p> <p>For example:</p> <p style="padding-left: 20px;">An artist wants to build a right-triangular frame in which one of the legs exceeds the other in length by 1 unit, and in which the hypotenuse exceeds the longer leg in length by 1 unit. Use algebra to show that there is one and only one such right triangle, and determine its side lengths.</p>	MP.1, MP.4, MP.5	Y
D	HS.D.2-2	Solve multi-step contextual problems with degree of difficulty appropriate to the course involving perimeter, area, or volume that require finding an approximate solution to a polynomial equation using numerical/graphical means.	<p style="text-align: center;">PBA</p> <p>i.) Tasks may have a real world or mathematical context.</p> <p>ii.) Tasks may involve coordinates (G-GPE.7).</p> <p>iii.) Refer to A-REI.11 for some of the content knowledge from the previous course relevant to these tasks.</p> <p>iv.) Cubic polynomials are limited to polynomials in which linear and quadratic factors are available</p> <p>v.) To make the tasks involve strategic use of tools (MP.5), calculation and graphing aids are available but tasks do not prompt the student to use them.</p>	MP.1, MP.4, MP.5	Y

Geometry Evidence Statements

PBA Only
 PBA and EOY
 EOY Only

Subclaim	Evidence Statement Key	Evidence Statement Text	Clarifications, limits, emphases, and other information intended to ensure appropriate variety in tasks	Relationship to MP	Calculator*
D	HS.D.2-11	Solve multi-step contextual word problems with degree of difficulty appropriate to the course, requiring application of course-level knowledge and skills articulated in G-SRT.8, involving right triangles in an applied setting.	<p style="text-align: center;">PBA</p> <p>i.) Tasks may, or may not, require the student to autonomously make an assumption or simplification in order to apply techniques of right triangles. For example, a configuration of three buildings might form a triangle that is nearly, but not quite, a right triangle; then, a good approximate result can be obtained if the student autonomously approximates the triangle as a right triangle.</p>	MP.2 , MP.4	Y
D	HS.D.3-2a	<p>Micro-models: Autonomously apply a technique from pure mathematics to a real-world situation in which the technique yields valuable results even though it is obviously not applicable in a strict mathematical sense (e.g., profitably applying proportional relationships to a phenomenon that is obviously nonlinear or statistical in nature).</p> <p style="text-align: center;">Content Scope: Knowledge and skills articulated in the Geometry PBA.</p>	PBA -	MP 4, may involve MP.1, MP.2, MP.5, MP.7	Y
D	HS.D.3-4a	<p>Reasoned estimates: Use reasonable estimates of known quantities in a chain of reasoning that yields an estimate of an unknown quantity.</p> <p style="text-align: center;">Content Scope: Knowledge and skills articulated in the Geometry PBA.</p>	PBA -	MP 4, may involve MP.1, MP.2, MP.5, MP.7	Y

*Calculator Key:

Y – Yes; Assessed on Calculator Sections

N – No; Assessed on Non-Calculator Sections

X – Calculator is Specific to Item

Z – Calculator Neutral (Could Be on Calculator or Non-Calculator Sections)

Geometry Evidence Statements

PBA Only
 PBA and EOY
 EOY Only

Subclaim	Evidence Statement Key	Evidence Statement Text	Clarifications, limits, emphases, and other information intended to ensure appropriate variety in tasks	Relationship to MP	Calculator*
B	G-CO.1	Know precise definitions of angle, circle, perpendicular line, parallel line, and line segment, based on the undefined notions of point, line, distance along a line, and distance around a circular arc.	PBA/EOY i.) Definitions are limited to those in the evidence statement. ii.) Plane is also considered an undefined notion.	MP.6	Z
A	G-GPE.6	Find the point on a directed line segment between two given points that partitions the segment in a given ratio.	PBA/EOY -	MP.1, MP.5	X
A	G-SRT.1a	Verify experimentally the properties of dilations given by a center and a scale factor. a) A 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.	PBA/EOY -	MP.1, MP.3, MP.5, MP.8	Z
A	G-SRT.1b	Verify experimentally the properties of dilations given by a center and a scale factor. b) The dilation of a line segment is longer or shorter in the ratio given by the scale factor.	PBA/EOY-	MP.1, MP.3, MP.5,MP.8	Z
A	G-SRT.2	Given two figures, use the definition of similarity in terms of similarity transformations to decide if they are similar.	PBA/EOY i.) The "explain" part of standard G-SRT.2 is not assessed here. See Sub-Claim C for this aspect of the standard.	MP.7	Z
A	G-SRT.7-2	Use the relationship between the sine and cosine of complementary angles.	PBA/EOY i.) The "explain" part of standard G-SRT.7 is not assessed here; See Subclaim C for this aspect of the standard.	MP.7	Z
A	G-SRT.8	Use trigonometric ratios and the Pythagorean Theorem to solve right triangles in applied problems.	PBA/EOY i.) The task may have a real world or mathematical context. For rational solutions, exact values are required. For irrational solutions, exact or decimal approximations may be required. Simplifying or rewriting radicals is not required; however, students will not be penalized if they simplify the radicals correctly.	MP.1, P.2, MP.5, MP.6	Y

*Calculator Key:

Y – Yes; Assessed on Calculator Sections

N – No; Assessed on Non-Calculator Sections

X – Calculator is Specific to Item

Z – Calculator Neutral (Could Be on Calculator or Non-Calculator Sections)

Geometry Evidence Statements

PBA Only
 PBA and EOY
 EOY Only

Subclaim	Evidence Statement Key	Evidence Statement Text	Clarifications, limits, emphases, and other information intended to ensure appropriate variety in tasks	Relationship to MP	Calculator*
B	G-C.2	Identify and describe relationships among inscribed angles, radii, and chords and apply these concepts in problem solving situations.	<p style="text-align: center;">EOY</p> <p>i.) Include the relationship between central, inscribed, and circumscribed angles: inscribed angles on a diameter are right angles; the radius of a circle is perpendicular to the tangent where the radius intersects the circle.</p> <p>ii.) This does not include angles and segment relationships with tangents and secants.</p>	MP.1, MP.5	X
B	G-C.B	Find arc lengths and areas of sectors of circles.	<p style="text-align: center;">EOY</p> <p>i.) Tasks involve computing arc lengths or areas of sectors given the radius and the angle subtended; or vice versa.</p>	-	X
B	G-CO.3	Given a rectangle, parallelogram, trapezoid, or regular polygon, describe the rotations and reflections that carry it onto itself.	EOY -	MP.5, MP.6, MP.7	Z
B	G-CO.5	Given a geometric figure and a rotation, reflection, or translation, draw the transformed figure using, e.g., graph paper, tracing paper, or geometry software. Specify a sequence of transformations that will carry a given figure onto another.	EOY -	MP.5, MP.6, MP.7	Z
A	G-CO.6	Use geometric descriptions of rigid motions to transform figures and to predict the effect of a given rigid motion on a given figure; given two figures, use the definition of congruence in terms of rigid motions to decide if they are congruent.	EOY -	MP.3	Z
A	G-CO.C	Prove geometric theorems as detailed in G-CO.C.	<p style="text-align: center;">EOY</p> <p>i.) About 75% of tasks align to G.CO.9 or G.CO.10.</p> <p>ii.) Theorems include but are not limited to the examples listed in standards G-CO.9,10,11.</p>	MP.3, MP.6	Z
A	G-CO.D	Make and understand geometric constructions as detailed in G-CO.D.	<p style="text-align: center;">EOY</p> <p>i.) About 75% of tasks align to G.CO.12.</p> <p>ii.) Tasks may include requiring students to justify steps and results of a given construction.</p>	MP.3, MP.5, MP.6	Z

Geometry Evidence Statements

PBA Only
 PBA and EOY
 EOY Only

Subclaim	Evidence Statement Key	Evidence Statement Text	Clarifications, limits, emphases, and other information intended to ensure appropriate variety in tasks	Relationship to MP	Calculator*
B	G-GMD.1	Give an informal argument for the formulas for the circumference of a circle, area of a circle, volume of a cylinder, pyramid, and cone. <i>Use dissection arguments, Cavalieri's principle, and informal limit arguments.</i>	EOY -	MP.3, MP.6, MP.7	Z
B	G-GMD.3	Use volume formulas for cylinders, pyramids, cones, and spheres to solve problems.	EOY -	MP. 4	X
B	G-GMD.4	Identify the shapes of two-dimensional cross-sections of three-dimensional objects, and identify three-dimensional objects generated by rotations of two-dimensional objects.	i.) If the cross section is a conic section it will be limited to circles, ellipses, and parabolas. (It will not include hyperbolas.)	MP.7	Z
B	G-GPE.1-1	Complete the square to find the center and radius of a circle given by an equation.	EOY i.) The "derive" part of standard G-GPE.1 is not assessed here.	MP.6	Z
B	G-GPE.1-2	Understand or complete a derivation of the equation of a circle of given center and radius using the Pythagorean Theorem; complete the square to find the center and radius of a circle given by an equation.	EOY i.) Tasks must go beyond simply finding the center and radius of a circle.	MP.6	Z
A	G-SRT.5	Use congruence and similarity criteria for triangles to solve problems and to prove relationships in geometric figures.	EOY i.) For example, find a missing angle or side in a triangle.	MP.7	Z
Ψ	G-Int.1	Solve multi-step contextual word problems with degree of difficulty appropriate to the course, requiring application of course-level knowledge and skills articulated in G-MG and G-GPE.7.	EOY i.) MG is the primary content ii.) See examples at https://www.illustrativemathematics.org/ for G-MG.	MP.1, MP.2, P.4, MP.5, MP.6	X

Ψ - This integrated evidence statements will be reported in the Master Claim which is used to determine if a student is college or career ready.

*Calculator Key:

Y – Yes; Assessed on Calculator Sections

N – No; Assessed on Non-Calculator Sections

X – Calculator is Specific to Item

Z – Calculator Neutral (Could Be on Calculator or Non-Calculator Sections)

Geometry Assessment Policies

Calculators:

- PARCC mathematics assessments allow a graphing calculator with functionalities consistent with TI -84 or similar models in Geometry.
- For students who meet the guidelines in the *PARCC Accessibility Features and Accommodations Manual* for a calculation device, this accommodation allows a calculation device to be used on the non- calculator section of any PARCC mathematics assessment. The student will need a hand-held calculator because an online calculator will not be available. If a student needs a specific calculator (e.g., large key, talking), the student can also bring his or her own, provided it is specified in his or her approved IEP or 504 Plan and meets the same guidelines.

Additionally, schools must adhere to the following additional guidance regarding calculators:

- No calculators with Computer Algebra System (CAS) features are allowed.
- No tablet, laptop (or PDA), or phone-based calculators are allowed during PARCC assessments.
- Students are not allowed to share calculators within a testing session.
- Test administrators must confirm that memory on all calculators has been cleared before and after the testing sessions.
- Calculators with “QWERTY” keyboards are **not** permitted.
- If schools or districts permit students to bring their own hand-held calculators for PARCC assessment purposes, test administrators must confirm that the calculators meet PARCC requirements as defined above.

Scratch Paper and Graph Paper:

- Blank **scratch paper** (lined or un-lined paper) is **required** and is intended for use by students to take notes and work through items during testing. At least two pages per unit must be provided to each student. Any work on scratch paper will **not** be scored.
- **Graph paper** is **allowable** for the PARCC Geometry assessments and is considered scratch paper if used.

Geometry Tools (allowable but not required):

- A ruler, a protractor, tracing paper, reflection tools, straight edge and compass are allowable materials for the Geometry assessments for both the paper-based and online assessments. These allowable tools must be provided by the school or students if used.
- If schools allow students to bring their own tools, they must be given to the school test coordinator or test administrator prior to testing to ensure that the tools are appropriate for testing (e.g., tools do not have any writing on them).
- Directions should be given to the test administrator to have the materials located in a pre-determined location in the testing room. Additional administration guidance will be given in the PARCC Test Administrator Manual.

Mathematics Reference Sheet:

- For computer-based assessments, the mathematics reference sheets are provided on the computer-based delivery platform. If desired, schools may also make printed copies available to students during administration.
- For paper-based assessments, mathematics reference sheets are provided in the PARCC-provided materials during shipment.

High School Assessment Reference Sheet

1 inch = 2.54 centimeters	1 kilometer = 0.62 mile	1 cup = 8 fluid ounces
1 meter = 39.37 inches	1 pound = 16 ounces	1 pint = 2 cups
1 mile = 5280 feet	1 pound = 0.454 kilograms	1 quart = 2 pints
1 mile = 1760 yards	1 kilogram = 2.2 pounds	1 gallon = 4 quarts
1 mile = 1.609 kilometers	1 ton = 2000 pounds	1 gallon = 3.785 liters
		1 liter = 0.264 gallons
		1 liter = 1000 cubic centimeters

Triangle	$A = \frac{1}{2}bh$
Parallelogram	$A = bh$
Circle	$A = \pi r^2$
Circle	$C = \pi d$ or $C = 2\pi r$
General Prisms	$V = Bh$
Cylinder	$V = \pi r^2 h$
Sphere	$V = \frac{4}{3}\pi r^3$
Cone	$V = \frac{1}{3}\pi r^2 h$
Pyramid	$V = \frac{1}{3}Bh$

Pythagorean Theorem	$a^2 + b^2 = c^2$
Quadratic Formula	$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$
Arithmetic Sequence	$a_n = a_1 + (n - 1)d$
Geometric Sequence	$a_n = a_1 r^{n-1}$
Geometric Series	$S_n = \frac{a_1 - a_1 r^n}{1 - r}$ where $r \neq 1$
Radians	1 radian = $\frac{180}{\pi}$ degrees
Degrees	1 degree = $\frac{\pi}{180}$ radians
Exponential Growth/Decay	$A = A_0 e^{k(t-t_0)} + B_0$