

## Grade 9-12 Unpacked Advanced Math Standards – Geometry

**9-12.G.1.1.A.** Students are able to **justify** properties of geometric figures.

**Webb Level: 3**

**Bloom: Evaluation**

**Verbs Defined:**

**Justify:** Explaining

**Key terms defined:**

Properties: set of mathematical rules, definitions, postulates and theorems

Geometric Figures: any two or three dimensional shape

**Teacher Speak:**

Students are able to justify (explain) properties of geometric figures.

**Student Speak:**

- Given a property of a geometric figure:
    - I can explain why a statement is true.
    - If a statement is false, I can provide a counterexample. (An example showing why something is false.)
  - I can write direct and indirect proofs for geometric shapes.
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**9-12.G.1.2A.** Students are able to **determine** the values of the sine, cosine, and tangent ratios of right triangles.

**Webb Level: 1**

**Bloom: Application**

**Verbs Defined:**

**Determine:** find

**Key terms defined:**

Sine: In a right triangle, it is the ratio of the opposite leg to the hypotenuse.

Cosine: In a right triangle, it is the ratio of the adjacent leg to the hypotenuse.

Tangent: In a right triangle, it is the ratio of the opposite leg to the adjacent leg.

Ratio: A quotient of two numbers or like quantities.

**Teacher Speak:**

Students are able to determine (find) the values of the sine, cosine, and tangent ratios of right triangles.

**Student Speak:**

- Given any two sides of a right triangle, I can find the ratios for sine, cosine and tangent.
  - Given any two parts of a right triangle, I can find all of the missing parts.
  - I can use sine, cosine and tangent ratios to solve application problems that involve right triangles.
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**9-12.G.1.3A.** Students are able to **apply** properties associated with circles.

**Webb Level: 2**

**Bloom: Application**

**Verbs Defined:**

**Apply:** Use

**Teacher Speak:**

Students are able to apply properties associated with circles.

**Student Speak:**

- I can state the similarities and differences between a chord and a diameter.
  - Given the arc measures, I can find the measures of a central angle, an inscribed angle, the angle inside a circle formed by two chords, and the angle outside the circle formed by a combination of secants and/or tangents.
  - I can find the measure of the angle formed by the tangent and radius.
  - From given values, I can find the missing parts of chords, secants, and tangents.
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**9-12.G.1.4A.** Students are able to **use** formulas for surface area and volume to **solve** problems involving three-dimensional figures.

**Webb Level: 1**

**Bloom: Analysis**

**Verbs Defined:**

**Use:** apply

**Solve:** solve

**Key terms defined:**

Surface area: the area of the exterior of any solid object

Volume: the number cubes that are contained within any solid object

Three-Dimensional Figures: prisms, pyramids, cones, spheres and cylinders

**Teacher Speak:**

Students are able to use (apply) formulas for surface area and volume to solve problems involving three-dimensional figures.

**Student Speak:**

- Given the appropriate formulas, I can find the surface area or volume of any solid object or a combination of solid objects.
- Given the surface area or volume of any solid object, I can find the key missing parts.

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**9-12.G.2.1A.** Students are able to **use** Cartesian coordinates to **verify** geometric properties.

**Webb Level: 2**

**Bloom: Synthesis**

**Verbs Defined:**

**Use:** Apply

**Verify:** Show

**Key terms defined:**

Cartesian coordinates: x-y plane.

Geometric properties: Set of mathematical rules, definitions, postulates and theorems.

**Teacher Speak:**

Students are able to use (apply) Cartesian coordinates to verify (show) geometric properties.

**Student Speak:**

I can use apply Cartesian Coordinate System to show the geometric properties including:

- Midpoint
- Two shapes congruent and similar.
- Special segments in a triangle (median, altitude, angle bisector, circumcenter, incenter, orthocenter, centroid).
- The relationships of all quadrilaterals.