Circles

7.1/7.2 Investigate circles and apply formulas

CCSS	4 – Mastery	3 – Proficient	2 - Basic	1 – Below Basic	0 – No Evidence
Circle relationships (G.C.2, 8.EE.7)	Can extend thinking beyond the standard, including tasks that may involve one of the following: • Designing • Connecting • Synthesizing • Applying • Justifying • Critiquing • Analyzing • Creating • Proving	Describe the formula and use the relationship to calculate values (including variable expressions) for **all of the following:** • Central angle • Inscribed angle • Circumscribed angle • Inscribed angles on a diameter • Angle formed by the radius of a circle and a tangent	**Describe** the formula and use the relationship to calculate values (**including variable expressions**) for 4 of the following: • Central angle • Inscribed angle • Circumscribed angle • Inscribed angles on a diameter • Angle formed by the radius of a circle and a tangent	Use the relationship to calculate values (numerical only) for **3 of the following**: • Central angle • Inscribed angle • Circumscribed angle • Inscribed angles on a diameter • Angle formed by the radius of a circle and a tangent	Little evidence of reasoning or application to solve the problem Does not meet the criteria in a level 1
Prove and explain (G.C.1, G.C.5)		Use similarity **to prove**: • Circles are similar using transformations • The length of the arc intercepted by an angle is proportional to the radius **Derive and explain the formula** for the area of a sector	Use similarity to do **all** of the following: • Prove circles are similar using transformations • Calculate the length of an arc Given the area of a sector**, find the radius**	Use similarity to do **one** of the following: • Prove circles are similar using transformations • Calculate the length of an arc **Find the area** of a sector	
Explain circumference and area (G.GMD.1)		Give an informal argument for the formulas for the circumference of a circle **and** area of a circle	Give an informal argument for the formulas for the circumference of a circle **or** area of a circle	Use formulas for circumference and area of a circle to solve problems	
Constructions (G.C.4)		Construct a tangent line from a point outside a given circle to a circle **with precision.**	Construct a tangent line **from a point outside a given circle to a circle.**	Construct a tangent line **from a point on a circle**.	

G.C.1 Prove that all circles are similar.

G.C.2 Identify and describe relationships among inscribed angles, radii, and chords. *Include the relationship between central, inscribed, and circumscribed angles; inscribed angles on diameter are right angles; the radius of a circle is perpendicular to the tangent where the radius intersects the circle.*

G.C.3 Construct the inscribed and circumscribed circles of a triangle, and prove properties of angles for a quadrilateral inscribed in a circle.

G.C.4 Construct a tangent line from a point outside a given circle to the circle.

G.C.5 Derive using similarity the fact that the length of the arc intercepted by an angle is proportional to the radius, ~~and define the radian measure of the angle as the constant of proportionality;~~ derive the formula for the area of a sector.

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. Use dissection arguments, Cavalieri's principle, and informal limit arguments

8.EE.7 Solve linear equations in one variable. a - Give examples of linear equations in one variable with one solution, infinitely many solutions, or no solutions. Show which of these possibilities is the case by successively transforming the given equation into simpler forms, until an equivalent equation of the form x = a, a = a, or a = b results (where a and b are different numbers). b - Solve linear equations with rational number coefficients, including equations whose solutions require expanding expressions using the distributive property and collecting like terms.

Circles

7.3 Investigate and interpret circle equations.

CCSS	4 – Mastery	3 – Proficient	2 - Basic	1 – Below Basic	0 – No Evidence
Derive the equation (G.GPE.1, GPE.4)	Can extend thinking beyond the standard, including tasks that may involve one of the following: • Designing • Connecting • Synthesizing • Applying • Justifying • Critiquing • Analyzing • Creating • Proving	Use the Pythagorean theorem to find the **equation** of a circle **Justify** whether a point lies on a circle given the center **and a point on the circle**. Given the equation of a circle, sketch a graph of the circle	Use the Pythagorean theorem to find the **radius** of a circle **Determine** whether a point lies on a circle given the center of the circle **and the radius**.	**Given the equation,** determine whether a point lies on a circle. Identify the radius and center of a circle given an equation. Write the equation of a circle given the radius and center.	Little evidence of reasoning or application to solve the problem Does not meet the criteria in a level 1

G.GPE.1 Derive 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.

G.GPE.4 Use coordinates to prove simple geometric theorems algebraically. ~~*For example, prove or disprove that a figure defined by four given points in the coordinate plane is a rectangle;*~~ *prove or disprove that the point (1, √3) lies on the circle centered at the origin and containing the point (0, 2).*

Circles

8.1 Concurrency in Triangles

CCSS	4 – Mastery	3 – Proficient	2 - Basic	1 – Below Basic	0 – No Evidence
Concurrency in Triangles (G.CO.10)	Can extend thinking beyond the standard, including tasks that may involve one of the following: • Designing • Connecting • Synthesizing • Applying • Justifying • Critiquing • Analyzing • Creating • Proving	**Prove** the medians of a triangle meet at a point.	**Use constructions to show** the medians of a triangle meet at a point.	**Identify** the properties of a centroid	Little evidence of reasoning or application to solve the problem Does not meet the criteria in a level 1
Constructions (G.C.3)		Construct **both** of the following: • the inscribed circle of a triangle. • the circumscribed circle of a triangle.	Construct **one** of the following: • the inscribed circle of a triangle. • the circumscribed circle of a triangle.	**Identify** the following: • incenter is the intersection of the angle bisectors • circumcenter is the intersection perpendicular bisectors	

G.C.3 Construct the inscribed and circumscribed circles of a triangle, and prove properties of angles for a quadrilateral inscribed in a circle.

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.