Foundations 20 Math Rubrics

FP20.1 Student demonstrates an understanding of the mathematics involved in a historical event or an area of interest.

Beginning (1)	Approaching (2)	Meeting (3)	Exemplary (4)
I need more help with becoming consistent with the criteria.	I am able to show how math was involved in my event/area. I collected data/stated facts that were relevant to my topic.	I am able to explain the connection to math in my event/area. I am able to identify any bias or points of view. I was able to identify my data collection method or where I found my facts.	I am able to explain the importance of the math involved in my event/area. I am able to interpret my data/facts as to how it impacts society. I can identify any controversial issues and present multiple sides of the issues with supporting data, if applicable.

FP20.2 Student demonstrates an understanding of inductive and deductive reasoning including: analyzing

Beginning (1)	Approaching (2)	Meeting (3)	Exemplary (4)
I need more help with becoming consistent with the criteria.	I can make a conjecture by observing patterns and identifying properties. I can provide counterexamples to a conjecture with false conclusions.	I can analyze an argument for its validity. I can prove algebraic number relationships. I can prove conjectures. I can determine strategies for solving puzzles or winning games and explain these strategies.	I can justify the reasoning to my conjecture. I can identify situations involving inductive and/or deductive reasoning. I can identify errors in proofs. I can solve situational questions. I can compare inductive and deductive reasoning. I can create a variation of a puzzle or game and describe a strategy for solving the puzzle or winning the game.

conjectures, analyzing spatial puzzles and games, providing conjectures, solving problems.

Beginning (1)	Approaching (2)	Meeting (3)	Exemplary (4)
I need more help with becoming consistent with the criteria	I can determine and compare unit rates.	I can solve rate problems. I can determine rates from graphs and tables. I can relate slope of a graph to rate. I can describe situations where a rate might occur. I can analyze situations in which unit rates are determined and give reasons if the rate should be used or not.	I can justify my work. I can create non symbolic representations for rates. I can explain the meanings of rate in a situation and can explain the effect of factors within a situation that could influence the rate. I can solve situational questions.

FP20.3a Student demonstrates an understanding of proportional reasoning related to rates.

FP20.3b Student demonstrates an understanding of proportional reasoning related to scale diagrams.

Beginning (1)	Approaching (2)	Meeting (3)	Exemplary (4)
I need more help with becoming consistent with the criteria	I can determine 3 of 5 of the following: scale factor of 2D drawings, scale factor of 3D objects, determine unknown dimensions of 2D drawings, determine unknown	I can determine scale factor of 2D drawings, determine scale factor of 3D objects, determine unknown dimensions of 2D drawings, determine unknown	I can solve situational problems involving scale diagrams of 2D shapes and 3D objects.

	dimensions of 3D objects, draw a scale diagram of a 2D shape.	dimensions of 3D objects, draw a scale diagram of a 2D shape.	

FP20.3c Student demonstrates an understanding of proportional reasoning related to area, surface area and volume.

Beginning (1)	Approaching (2)	Meeting (3)	Exemplary (4)
I need more help with becoming consistent with the criteria.	I can find the ratio of areas, surface area or volume, given the scale factor of a 2D shape or 3D object,	I can determine the scale factor and apply this to solve for a value, given the ratio of areas, surface area or volume of an object.	I can solve situational questions. I can explain the effect of a change in scale factor on the area of a 2D shape or the surface area or volume of a 3D object.

FP20.4a Student demonstrates an understanding of the properties of angles and triangles including: deriving proofs based on theorems and postulates about congruent triangles and solving problems.

Beginning (1)	Approaching (2)	Meeting (3)	Exemplary (4)
I need more help with becoming consistent with the criteria.	I can find missing angle measures in BASIC diagrams of parallel lines cut by a transversal, triangles, and polygons.	I can find missing angle measures in any type of diagram of parallel lines cut by a transversal, triangles, and polygons. I can derive basic proofs. I can identify errors in a proof.	I can find missing angle measures when the given angles are a polynomial expression. I can construct parallel lines. I can perform error analysis.. I can explain why certain angles are equal in parallel lines. I can derive proofs. I can verify if angles formed by non-parallel lines and transversals create the same relationships as those created parallel lines.

FP20.5 Student demonstrates an understanding of the cosine law and sine law (including the ambiguous case).

Beginning (1)	Approaching (2)	Meeting (3)	Exemplary (4)
I need more help with becoming consistent with the criteria.	I can solve for a missing side or angle (excluding ambiguous case) when the diagram is given (including those in situational questions)	I can solve situational questions involving non right triangles (excluding the ambiguous case). I can illustrate and explain the possibilities for a given set of measurements for the ambiguous case.	I can explain the steps in a proof of the sine law and cosine law. I can illustrate and explain the possibilities for a given set of measurements for the ambiguous case. I can perform error analysis. I can solve situational problems that involve the ambiguous case.

FP20.6 Student demonstrates an understanding of normal distribution, standard deviation and z-scores.

Beginning (1)	Approaching (2)	Meeting (3)	Exemplary (4)
I need more help with becoming consistent with the criteria.	I can consistently determine at least 3 of the following: mean, median, mode, standard deviation, and z-score.	I can consistently determine the area under the curve. I can consistently sketch a normal distribution and analyze data to determine if it approximates normal distribution. I can compare normally distributed data sets and explain what it tells me. I can determine z-scores to fit a situation.	I can explain the application, meaning and purpose of: standard deviation, properties of a normal curve, and z-score. I can solve situational questions.

FP20.7 Student demonstrates an understanding of the interpretation of statistical data.

Beginning (1)	Approaching (2)	Meeting (3)	Exemplary (4)
I need more help with becoming consistent with the criteria.	I am able to identify the confidence level, confidence interval, and margin of error.	I am able to determine the range of the data in a poll/survey. I can explain how the size of the random sample used impacts the data. Using confidence intervals I can make inferences and decisions about a population from sample data.	I am able to critique real life examples in which statistical data is used to support a particular position. I can support a position by analyzing statistical data, as well as consider other factors.

FP20.8a Student demonstrates an understanding of systems of linear inequalities.

Beginning (1)	Approaching (2)	Meeting (3)	Exemplary (4)
I need more help with becoming consistent with the criteria.	I can graph the solution of one linear inequality. I can determine the solution of a linear inequality. I can determine if a point is in the solution of a linear inequality. I can match a graph with its linear inequality.	I can write a system of linear inequalities for a given graph. I can graph the solution of a system of linear inequalities. I can determine if a point is in the solution of a system of linear inequalities. I can determine if the boundaries and their points of intersection are part of the solution region. I can match situations with the graphs of a set of linear inequalities.	I can solve situational questions. I can verify my solution. I can justify my choice of solid or broken lines.

FP20.8b Student demonstrates an understanding of optimization problems.

Beginning (1)	Approaching (2)	Meeting (3)	Exemplary (4)
I need more help with becoming consistent with the criteria.	Given an optimization problem with the constraints, objective function and graph, I am able to find the vertices and max/min values of the objective function.	Given the restrictions, constraints, and objective function, I am able to graph and find the coordinates of the vertices and determine possible solutions to the question.	I can solve an optimization problem given just the situation. I can justify and explain feasible regions, coordinates of vertices and other parts of optimization problems.

FP20.9 Student demonstrates an understanding of the characteristics of quadratic functions of the form $y = a(x-p)^2 + q$, including: vertex, intercepts, domain, range, and axis of symmetry.

Beginning (1)	Approaching (2)	Meeting (3)	Exemplary (4)
I need more help with becoming consistent with the criteria.	I can determine • a, p and q • the coordinate of the vertex • the equation of the axis of symmetry • max/min value, • opens up/down	I can: • write the equation of the function given the graph • identify the roots/zeros/x-intercepts • determine y-intercept	I can: • explain the relationship between the roots, zeros and x-intercepts • explain what domain and range means in a situation • explain the number of possible x-intercepts a quadratic function has

	• domain and range	• sketch the graph of a quadratic function • determine the axis of symmetry given the x-intercepts	• explain the effects on the graph when a, p and q are changed • solve situational questions