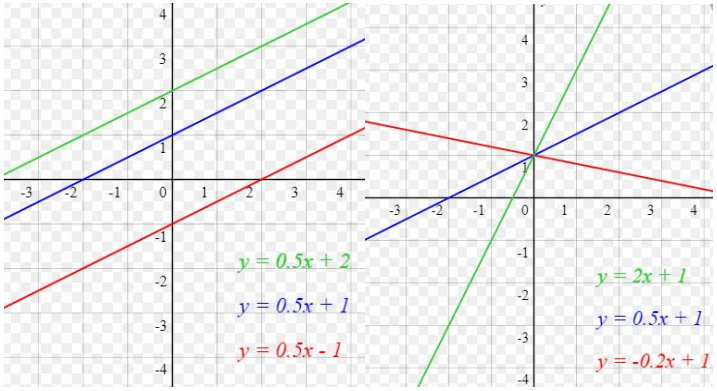
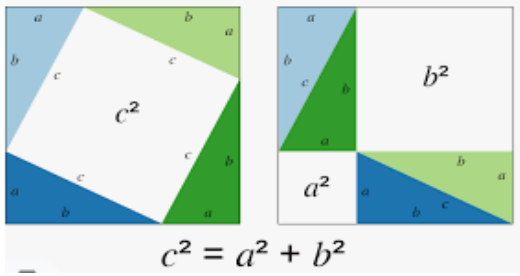
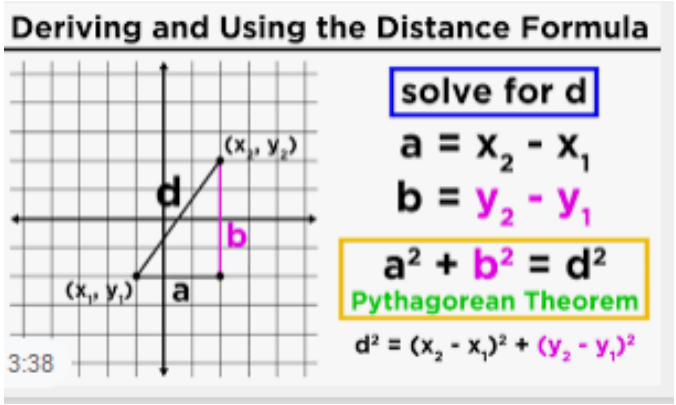
Grade 8 Math: Instructional Focus and Fluency

Transitioning to the NYS Next Generation Math Learning Standards for Grades K-8, Effective September 2022

Instructional Focus	Developmental Focus	Instructional Consideration (via Standards)
Formulate and reason about expressions and equations, including modeling an association in bivariate data with a linear equation, and solving linear equations and systems of linear equations.	➤ Recognize equations for proportions (y/x = m or y = mx) as special linear equations (y = mx + b) ➢ understanding that the constant of proportionality (m) is the slope, and the graphs are lines through the origin ➢ know the parts of the equation (x,y)represents the point, m represents the slope, and b represents the y intercept ➤ Understand that the slope (m) of a line is a constant rate of change ➤ Express a linear relationship between two quantities and interpret components of the relationship (such as slope and y-intercept) in terms of the situation  ➢ e.g., Compare a distance-time graph to a distance-time equation to determine which of two moving objects has greater speed.	**NY-8.EE.5** Graph proportional relationships, interpreting the unit rate as the slope of the graph. Compare two different proportional relationships represented in different ways. **NY-8.EE.6** Use similar triangles to explain why the slope m is the same between any two distinct points on a non-vertical line in the coordinate plane; derive the equation y = mx for a line through the origin and the equation y = mx + b for a line intercepting the vertical axis at b. **NY-8.EE.7** Solve linear equations in one variable.

Instructional Focus	Developmental Focus	Instructional Consideration (via Standards)
Formulate and reason about expressions and equations, including modeling an association in bivariate data with a linear equation, and solving linear equations and systems of linear equations continued…	➤ *(POST-TEST)** Solve systems of two linear equations in two variables and relate the systems to pairs of lines in the plane(intersect, parallel, or are the same line) ➤ *(systems are POST-TEST)** Apply linear and systems of linear equations to solve application problems ➢ one solution, no solutions, infinite solutions (may need to simplify) ➢ using rational number coefficients ➢ involving combining like terms, and using the distributive property	**NY-8.EE.8** *(POST-TEST)** Analyze and solve pairs of simultaneous linear equations.
Grasp the concept of a function and use functions to describe quantitative relationships a function as a rule that assigns to each input exactly one output.	➤ Understand that functions describe situations where one quantity determines another ➢ e.g., where the function is increasing or decreasing or when the function is linear or non-linear ➤ Translate among representations and partial representations of functions and describe how aspects of the function are reflected in the different representations ➢ function notation is NOT required in grade 8 ➢ include description, table, and graph representations ➢ include rate of change and initial value ➢ include linear and non-linear	**NY-8.F.4** Construct a function to model a linear relationship between two quantities. Determine the rate of change and initial value of the function from a description of a relationship or from two (x, y) values, including reading these from a table or from a graph. Interpret the rate of change and initial value of a linear function in terms of the situation it models, and in terms of its graph or a table of values. **NY-8.F.5** Describe qualitatively the functional relationship between two quantities by analyzing a graph. Sketch a graph that exhibits the qualitative features of a function that has been described in a real-world context.

Instructional Focus	Developmental Focus	Instructional Consideration (via Standards)
Analyze two- and three-dimensional space and figures using distance, angle, similarity, and congruence, and understanding and applying the Pythagorean Theorem.	➤ Use translations, rotations, reflections, and dilations to describe, analyze, and solve problems involving two dimensional figures ➢ lines/line segments mapped to lines/line segments ➢ angles mapped to angles ➢ parallel lines mapped to parallel lines ➢ establishing congruence/similarity using properties of transformations ➢ lines of reflection are limited to both axes and lines of the form y = k and x = k, where k is a constant when graphing ➢ rotations are limited to 90 and 180 degrees about the origin (unless otherwise specified, rotations are assumed to be counterclockwise) ➤ Show that the sum of the angles in a triangle is the angle formed by a straight line, and that various configurations of lines give rise to similar triangles because of the angles created when a transversal cuts parallel lines ➤ Understand the statement of the Pythagorean Theorem and its converse, and why the Pythagorean Theorem holds 	**NY-8.G.1** Verify experimentally the properties of rotations, reflections, and translations. **NY-8.G.2** Know that a two-dimensional figure is congruent to another if the corresponding angles are congruent and the corresponding sides are congruent. Equivalently, two two-dimensional figures are congruent if one is the image of the other after a sequence of rotations, reflections, and translations. Given two congruent figures, describe a sequence that maps the congruence between them on the coordinate plane. **NY-8.G.3** Describe the effect of dilations, translations, rotations, and reflections on two-dimensional figures using coordinates. **NY-8.G.4** Know that a two-dimensional figure is similar to another if the corresponding angles are congruent and the corresponding sides are in proportion. Equivalently, two two-dimensional figures are similar if one is the image of the other after a sequence of rotations, reflections, translations, and dilations. Given two similar two-dimensional figures, describe a sequence that maps the similarity between them on the coordinate plane.

Instructional Focus	Developmental Focus	Instructional Consideration (via Standards)
Analyze two- and three-dimensional space and figures using distance, angle, similarity, and congruence, and understanding and applying the Pythagorean Theorem continued…	➤ Apply the Pythagorean Theorem to find distances between points on the coordinate plane, to find lengths, and to analyze polygons.  https://youtu.be/wzQstigxbuo	**NY-8.G.5** Use informal arguments to establish facts about the angle sum and exterior angle of triangles, about the angles created when parallel lines are cut by a transversal, and the angle-angle criterion for similarity of triangles. **NY-8.G.6** Understand a proof of the Pythagorean Theorem and its converse. **NY-8.G.7** Apply the Pythagorean Theorem to determine unknown side lengths in right triangles in real world and mathematical problems in two and three dimensions. **NY-8.G.8** Apply the Pythagorean Theorem to find the distance between two points in a coordinate system**.**

Fluency	Fluency development	Fluency Standard
Solve systems of linear equations in two variables graphically, algebraically, and using a table. (*Procedural*).	➤ *(POST-TEST)** Solving systems algebraically will be limited to at least one equation containing at least one variable whose coefficient is 1. Algebraic solution methods include elimination and substitution.	**NY-8.EE.8b** *(POST-TEST)** Solve systems of two linear equations in two variables with integer coefficients: graphically, numerically using a table, and algebraically. Solve simple cases by inspection.

(POST-TEST) refers to standards content that is taught **after the NYS grade 3-8 assessment. This time typically occurs late April - June.*