



IM2 Essential Concepts

Algebra and Functions

Expressions & Equivalence	1. I understand how an area model can be used to show the equivalence of various quadratic expressions (factored, standard, vertex/graphing)
The Function Concept	2. I understand the connections between multiple representations of functions (context, rule, table, graph). I can generate missing representations from this “web” and I can use these representations to reason about real-life situations.
Building Rules to Represent Functions	3. I understand the defining characteristics of quadratic functions (roots, vertex, parabolic/symmetrical shape) and can build rules to represent these functions in standard, factored, and vertex form.
	4. I understand how transformations of functions (ex. $f(x)+k$, $kf(x)$, $f(x+k)$) work and I can use these to model real-life situations.
	5. I understand how function composition and arithmetic work and I can use these to model real-life situations.
	6. I understand inverse functions as “undoing machines” that operate on outputs in order to get back to the original input. I can use this idea to reason about inverse functions and to build rules for inverse functions.

Geometry and Measurement

Scale, Proportion, and Similarity	7. I can define what it means for two figures to be similar. I can reason from this definition to prove that two figures are or aren’t similar.
	8. I understand that measurements of scaled (dilated) shapes are proportional and I can use this to find unknown lengths, areas, or volumes.
	9. I understand trigonometric ratios in terms of similarity and I can use these ratios to find unknown measurements.
Reasoning about Properties of Shape	10. I can use definitions and known (previously proven) facts to reason about and prove properties of shapes (ex. <i>justifying angle relationships formed by transversal, central/interior/exterior angles of polygons, features of quadrilaterals, etc.</i>)
	11. I can use coordinates to reason about distance(s) in the coordinate plane. I can use these ideas to prove geometric theorems and/or properties of shape (ex. <i>reinvent the equation for a circle in the coordinate plane</i>).
Modeling with Geometry	12. I can use geometric shapes to create simplified models of real-life problems, find solutions to those problems, and interpret those solutions back in the original context.

Statistics and Probability

Reasoning about Chance	13. I can use various probability models – area models, tree diagrams, two-way tables, etc – to reason about different types of problems involving chance (including conditional events, compound events, and independence).
	14. I understand that expected value is what will happen, on average, in the long run. I can use this understanding to calculate and use expected value in analyzing situations of chance.