



## Correlation of *Interactive Mathematics Program (IMP)* with West Virginia Specific Criteria for Content and Skills Integrated Math Year Four

### INTRODUCTION

Integrated Mathematics – Years I, II and III provide a core mathematics curriculum for all students in grades 9–12; year IV continues the preparation of students for college mathematics. The courses are designed to implement the vision of high school mathematics portrayed in the National Council of Teachers of Mathematics Principles and Standards for School Mathematics. These courses feature ‘strands’ of algebra and function, geometry and trigonometry, statistics and probability, and discrete mathematics connected within units by fundamental ideas and across units by mathematical processes.

The evaluation of all mathematics materials is based on separate criteria for three (3) categories:

- Category I: Standards Based Components
- Category II: Technology and Manipulatives
- Category III: Mathematics Content

In order to be approved and listed on the West Virginia Multiple List for Mathematics Materials, each category must be evaluated separately.

- Category I: Standards Based Components must meet 80% (4/5) of the criteria at "In-depth" and/or "Adequate."
- Category II: Technology and Manipulatives must also meet 80% (7/8) of the criteria at "In-depth" and/or "Adequate."
- Category III: Mathematics Content must meet 80% of the criteria at "In-depth" and/or "Adequate" for each grade level or course.



Standard	Expectations	Correlation of <i>IMP</i> Year 4
<p>All materials at this grade level (1) be research based and theory driven; (2) incorporate basic, accurate information that is developmentally appropriate; (3) use interactive activities that actively engage students; (4) provide students with opportunities to model and practice relevant skills; (5) develop higher order thinking opportunities; and (6) be based on national standards. The instructional materials should provide students with opportunities to:</p>	<ol style="list-style-type: none"> <li>1. define and use to develop the complex number system; simplify powers and products of it (A2.2.3)</li> <li>2. perform basic operations with complex numbers and give answers in simplest form (A2.2.4)</li> <li>3. explore basic families of functions: recognize linear, quadratic, absolute value, step, and exponential functions; and convert among graphs, tables and equations (A2.2.10)</li> <li>4. explore the conic sections; recognize, identify, and sketch the graphs of a parabola, circle, ellipse, and hyperbola; and convert between graphs and equations (A2.2.14)</li> <li>5. solve absolute value equations and inequalities graphically, numerically, and algebraically (A2.2.15)</li> </ol>	<p><b>A. ALGEBRA/PRECALCULUS 4</b></p> <hr/> <p><i>Know How</i> On Your Own: pp. 236-239</p> <hr/> <p><i>Know How</i> On Your Own: pp. 236-239</p> <hr/> <p><i>World of Functions</i> What &amp; Why of Functions: pp. 258-259, 262-264 Tables: pp. 266-276, 280-281 Going to the Limit: pp. 283-290 Who's Who?: pp. 292-299 Tight Fit: pp. 301-305 Back to Arithmetic: pp. 313-314 Back to the Beginning: p. 342</p> <hr/> <p>YEAR 3: <i>Fireworks, Orchard Hideout</i></p> <p><i>Know How</i> On Your Own: pp. 226-230</p> <p><i>World of Functions</i> What &amp; Why of Functions: pp. 258, 264 Tables: pp. 268, 271-272, 280-281 Back to the Beginning: p. 342</p> <hr/> <p><i>World of Functions</i> Tight Fit: p. 303</p>



Standard	Expectations	Correlation of <i>IMP</i> Year 4
	<p>6. investigate and sketch the graphs of polynomials and rational functions using the characteristics of zeros, upper and lower bounds, y-intercepts, symmetry, asymptotes and end behavior, maximum and minimum points and domain and range (PC.2.1)</p> <p>7. solve higher order polynomial equations utilizing techniques such as Descartes' Rule of Signs, upper and lower bounds, and Rational Root Theorem (PC.2.2)</p> <p>8. apply the method of mathematical induction to prove formulas and statements (PC.2.9)</p>	<p><b>A. ALGEBRA/PRECALCULUS 4</b> (<i>continued</i>)</p> <hr/> <p>YEAR 3: <i>Fireworks</i> <i>World of Functions</i>     What &amp; Why of Functions: pp. 258-259     Going to the Limit: pp. 283-290     Who's Who?: p. 296</p> <hr/> <p><i>High Dive</i>     Falling Start: pp. 73-77 <i>World of Functions</i>     Who's Who?: pp. 292-293</p> <hr/> <p><i>High Dive</i>     Going to the Circus: pp. 8-10     Height &amp; the Sine: pp. 15, 20-23, 28-29     Falling, Falling, Falling: pp. 34-35     Moving Left &amp; Right: pp. 42, 44-47     Velocity: 84-88 <i>As the Cube Turns</i>     Picture This!: pp. 115-118     Translation in Two Dimensions: pp. 140-141     Rotating in Two Dimensions: pp. 143-146     Projecting Pictures: pp. 161-164, 167-169, 172-174 <i>World of Functions</i>     Tables: pp. 271-275</p>



Standard	Expectations	Correlation of <i>IMP</i> Year 4
	<p>9. graph functions and conic sections using translation (PC.3.1)</p> <hr/> <p>10. investigate properties and solve practical problems of the conic sections (PC.3.2)</p>	<p><b>A. ALGEBRA/PRECALCULUS 4</b> (<i>continued</i>)</p> <hr/> <p>YEAR 3: <i>Fireworks</i> <i>Know How</i> On Your Own: pp. 226-230</p> <p><i>World of Functions</i> Transforming Functions: pp. 336-340</p> <hr/> <p>YEAR 3: <i>Fireworks</i> <i>High Dive</i> Falling, Falling, Falling: pp. 31-35 Falling Start: pp. 69, 71-72, 75-77</p> <p><i>Know How</i> On Your Own: pp. 226-230</p> <p><i>World of Functions</i> What &amp; Why of Functions: pp. 258, 264 Tables: pp. 268, 271-272, 280</p>



Standard	Expectations	Correlation of <i>IMP</i> Year 4
	<p>1. using transformational geometry, create a reflection, translation, rotation, glide reflection and dilation of a figure; and apply transformations and use symmetry to analyze mathematical situations (G.3.18)</p> <hr/> <p>2. Circular function definitions will be connected with trigonometric function definitions (T.3.1)</p> <hr/> <p>3. develop recall of the values of the six trigonometric functions of special angles as related to the unit circle (T.3.3)</p> <hr/> <p>4. convert angle measures from radians to degrees and vice versa (T.3.5)</p>	<p><b>B. GEOMETRY/TRIGONOMETRY 4</b></p> <hr/> <p><i>As the Cube Turns</i> Programming Loops: pp. 127-128, 130-132 Translation in Two Dimensions: pp. 134-139 Rotating in Two Dimensions: pp. 143, 150-152, 156 Projecting Pictures: pp. 170-171, 175 Rotating in Three Dimensions: pp. 186-187</p> <hr/> <p><i>High Dive</i> Height &amp; the Sine: pp. 15, 17-27 Moving Left &amp; Right: pp. 44-45 Finding the Release Time: pp. 51-53 Trigonometric Interlude: p. 61</p> <hr/> <p><i>High Dive</i> Height &amp; the Sine: p. 23 Finding the Release Time: pp. 51-52 Trigonometric Interlude: pp. 61, 64-65</p> <p><i>As the Cube Turns</i> Rotating in Two Dimensions: pp. 148-149</p> <hr/> <p><i>High Dive</i> Trigonometric Interlude: pp. 55-65</p>



Standard	Expectations	Correlation of <i>IMP</i> Year 4
	<p>5. verify trigonometric identities by making substitutions and recalling basic identities (T.3.6)</p> <hr/> <p>6. solve trigonometric equations that include both infinite solutions and solutions with a restricted domain (T.3.7)</p> <hr/> <p>7. find the value of inverse trigonometric functions (T.3.8)</p>	<p><b>B. GEOMETRY/TRIGONOMETRY 4</b> (<i>continued</i>)</p> <hr/> <p><i>High Dive</i> Height &amp; the Sine: pp. 26-27 Finding the Release Time: pp. 51-52 Trigonometric Interlude: pp. 62-65</p> <p><i>As the Cube Turns</i> Translation in Two Dimensions: pp. 140-141 Rotating in Two Dimensions: pp. 144-149, 157</p> <p><i>Know How</i> On Your Own: pp. 223-225</p> <hr/> <p><i>High Dive</i> Going to the Circus: pp. 11-13 Height &amp; the Sine: pp. 15, 21-27 Moving Left &amp; Right: pp. 40-45 Finding the Release Time: pp. 49, 51-52 Trigonometric Interlude: pp. 55-67 Falling Start: p. 75 Components of Velocity: 79, 84-87, 89 High Dive Concluded: pp. 92-93</p> <hr/> <p><i>High Dive</i> Going to the Circus: pp. 12-13 Height &amp; the Sine: pp. 16, 24-27 Falling, Falling, Falling: p. 36 Finding the Release Time: pp. 51-52</p>



Standard	Expectations	Correlation of <i>IMP</i> Year 4
	<p>8. express complex numbers in polar form: perform operations including adding, subtracting, multiplying, and dividing; evaluate powers and roots of complex numbers using De Moivre's Theorem; and graph complex numbers (T.3.10)</p> <p>9. solve practical problems involving triangles using the trigonometric functions, the Pythagorean Theorem, the Law of Sines, and the Law of Cosines (T.3.11)</p>	<p><b>B. GEOMETRY/TRIGONOMETRY 4</b> (<i>continued</i>)</p> <hr/> <p><i>Know How</i> On Your Own: pp. 236-239</p> <hr/> <p><i>High Dive</i> Going to the Circus: pp. 11-13 Height &amp; the Sine: pp. 16, 24-27 Moving Left &amp; Right: pp. 40-41 Finding the Release Time: pp. 49-50 Falling Start: pp. 71-72 Components of Velocity: 81-87 High Dive Concluded: pp. 92-93</p> <p><i>As the Cube Turns</i> Programming Loops: pp. 131-132 Translation in Two Dimensions: pp. 140-141 Rotating in Two Dimensions: pp. 144-145 Rotating in Three Dimensions: pp. 185-187</p> <p><i>Know How</i> On Your Own: pp. 223-225</p>



Standard	Expectations	Correlation of <i>IMP</i> Year 4
	<p>10. recognize the graph of the six trigonometric functions. Given an equation in the form of <math>y=a\sin(bx+c)+d</math>, identify the domain and range; determine the period, phase shift, amplitude and vertical shift; and sketch at least one period of the graph (T.3.12)</p> <hr/> <p>11. model periodic data sets using graphs, tables, and equations (T.3.13)</p> <hr/> <p>12. recognize and graph the inverse of trigonometric functions. Restrictions on the domain will be included (T.3.14)</p> <hr/> <p>13. develop and use formulas such as sum or difference of two angles, double-angle, and half-angle (T.3.15)</p>	<p><b>B. GEOMETRY/TRIGONOMETRY 4</b> (<i>continued</i>)</p> <hr/> <p><i>High Dive</i> Height &amp; the Sine: pp. 21-23 Finding the Release Time: p. 53</p> <p><i>As the Cube Turns</i> Rotating in Two Dimensions: pp. 148-149</p> <p><i>World of Functions</i> What &amp; Why of Functions: p. 262 Composing Functions: pp. 326</p> <hr/> <p><i>High Dive</i> Going to the Circus: pp. 11-13 Height &amp; the Sine: pp. 15, 19-22, 24-27 Moving Left &amp; Right: pp. 40-41, 43-45 Finding the Release Time: pp. 49</p> <p><i>World of Functions</i> What &amp; Why of Functions: p. 262 Who's Who?: p. 295 Composing Functions: p. 326</p> <hr/> <p><i>World of Functions</i> Composing Functions: pp. 328-334</p> <hr/> <p><i>As the Cube Turns</i> Rotating in Two Dimensions: pp. 144-146, 157</p>



Standard	Expectations	Correlation of <i>IMP</i> Year 4
	<hr/> <ol style="list-style-type: none"> <li>determine the correlation values for given data or for data generated by students and use the results to describe the association of the variables within the given data. Identify whether this association is systematic or predictable (PS.5.12)</li> <li>perform a regression analysis on a set of data, either given or created through experimentation, and use the results to predict specific values of a variable. Identify the regression equation (PS.5.15)</li> <li>perform an analysis of variance (ANOVA) and interpret the results (PS.5.16)</li> <li>perform a regression analysis on a set of data and use the results to predict specific values of a variable. Identify the regression equation (PC.5.1)</li> </ol>	<p><b>C. DATA ANALYSIS/STATISTICS 4</b></p> <hr/> <p><i>World of Functions</i> Who's Who?: pp. 296-299 Tight Fit: pp. 301-303</p> <hr/> <p><i>World of Functions</i> Who's Who?: pp. 296-299 Tight Fit: pp. 301-303</p> <hr/> <p><i>World of Functions</i> Who's Who?: pp. 296-299 Tight Fit: pp. 301-303</p>