# Crosswalk Directions:

## UMS Standards for College Readiness to 2007 MLR

1. Use a Y (yes), an N (no), or a P (partially) to indicate the extent to which the standard, performance indicator, or descriptor of the 2007 MLR can be found in the 1997 MLR. If you indicate that the standard or performance indicator is partially found, please explain in the cell of the spreadsheet. If you answer "no", please respond only to questions 6, 8, and 9.
2. Use a Y (yes), an N (no), or a P (partially) to indicate the extent to which the concept/idea of the 2007 MLR standard, performance indicator, or descriptor can be found in the 1997 MLR. If you indicate that the idea/concept is partially found, please explain in the cell of the spreadsheet.
3. Use a Y (yes), an N (no), or a P (partially) to indicate the extent to which whether the wording of the 2007 MLR standard, performance indicator, or descriptor can be found in the 1997 MLR. If you indicate that the wording is partially found, please explain in the cell of the spreadsheet.
4. Indicate where the standard, performance indicator, or descriptor of the 2007 MLR can be found in the standards or performance indicators of the 1997 MLR. For example, one might indicate A (standard A), A1 (standard A, performance indicator 1), or A1, 2 (standard A, performance indicators1 and 2).
5. Indicate with a Y (yes) or an N (no) whether the performance indicator of the 2007 MLR can be found at the same grade span in the 1997 MLR. If "no", indicate the grade span where the performance indicator is found in the 1997 MLR. As an example, a performance indicator found in 6-8 in the 2007 should be considered to be at a different grade span if it is found at 5-8 in the 1997 MLR.
6. Indicate with a 1, 2, 3, 4, 5 or 6 the level of Bloom's Taxonomy that best represents the cognitive demand of the 2007 MLR. Where more than one level of cognitive demand is indicated please use more that one designation. Please use the attached copy of Bloom to guide your decision about the cognitive demand.
7. Indicate with a 1, 2, 3, 4, 5 or 6 the level of Bloom's Taxonomy that best represents the cognitive demand of the 1997 MLR. Where more than one level of cognitive demand is indicated please use more that one designation. Please use the attached copy of Bloom to guide your decision about the cognitive demand.
8. At the end of the standards, performance indicators and descriptors please list those standards and performance indicators and descriptors of the 1997 MLR not found in the 2007 MLR.

| | CONTINUITY | | | | | | |
|---|---|---|---|---|---|---|---|
| **Mathematics CROSSWALK: UMS** *College Readiness for Mathematics* **to 2007 Proposed** *Learning Results* | **Is it in the 2007 MLRs?** | **Is the CONCEPT/ IDEA the same?** | **Is the WORDING the same?** | **WHERE is it found? (Standard, PI)** | **Is it at the same grade span or grade level? (HS)** | **At what level of Bloom's taxonomy is the COGNITIVE DEMAND in the UMS SCR?** | **At what level of Bloom's taxonomy is the COGNITIVE DEMAND in the 2007 MLR?** |
| **I. Mathematical Reasoning** | | | | | | | |
| A. Successful students know important definitions, why definitions are necessary and are able to use mathematical reasoning to solve problems; they | | | | | | | |
| *Use and understand inductive reasoning and deductive reasoning and understand the differences between them | P | P, no explicit statement about difference | No, these are in the overall statement | Intro page 1, paragraph 4; C1(9)a, C2(9)ab, | all levels | 2,3,4,5 | 3,4,5 |
| *Use geometric and visual reasoning | Y | Y | N, spatial visualization in MLRs | Intro page 1, paragraph 4 | all levels | 3,4,5 | 3,4,5 |
| *Use multiple representations (e.g., analytic, numerical and geometric) to solve problems. (This is extremely important – the concept that there is not just one correct way to solve a problem) | Y | Y | N | Intro page 1, paragraphs 3, 4; general statement D | all levels | 3,4,5 | 3,4,5 |
| *Use a variety of strategies to revise solution processes | P | P | no "revise" | Intro page 1, paragraphs 3, 4 | all levels | 3,4,5,6 | 3,4,5 |
| *Understand the uses of both proof and counterexample in problem solutions, know how to use and generate counterexamples, are able to conduct simple proofs | P | P, counterexample not mentioned | N | Intro page 1, paragraphs 3, 4 | all levels | 3,4,5 | 3,4,5 |
| *Are familiar with the process of creating and understanding mathematical models from word problems, geometric problems and applications and are able to interpret solutions in the context of these source problems | P | P, source problems not mentioned | N | general statements C,D; intro paragrahs 3 &4 | all levels | 3,4 | 3,4,5 |
| Translate simple statements into operations | Y | Y | N | A3(5), A2(7), D1(4), D1(5), D1(6)ab; D1(7)ab | N | 2,3 | 2,3 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Understand the role of written symbols in representing mathematical ideas and the precise use of special symbols of mathematics | P | P, precise use of symbols not specified in MLRs | N | D1(4), D1(5), D1(6)ab; D1(7)ab, D2(9)ade, D4(9)a, D5(9)a | Y | 2 | 2,3,4 |
| | | | | | | | |
| B. Successful students know how to estimate; they | | | | | | | |
| *Are able to convert between decimal approximations and fractions | Y | Y | N | A2(6) | N | 3 | 3 |
| *Know when to use an estimation or approximation in place of an exact answer | P | "in place of" not explicit | N | **A** (general statement), **B** (general statement) | all levels | 3 | 3 |
| *Recognize the accuracy of an estimation | P | no comparison is aked for explicitly, measures seen as approximations | N | **A** (general statement), **B** (general statement), B1(9)abc | Y | 2,3 | 2,3,4 |
| *Know how to make and use estimations | Y | Y | N | **A** (general statement), **B** (general statement) | all levels | 3 | 3 |
| | | | | | | | |
| C. Successful students understand the appropriate use as well as the limitation of calculators; they | | | | | | | |
| *Recognize when the results produced are unreasonable or represent misinformation | P | P - says "estimation should always be done with calculation or when solving problems"; not specific to | N | A (general) | all levels | 2, 3 | 3 |
| *Use calculators for systematic trial-and-error problem solving | Y | Y | N, MLRs use "iteration" rather than trial and error | D5(9)b | Y | 3 | 3 |
| | | | | | | | |

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| D. Successful students are able to generalize and to go from specific to abstract and back again. They have a basic understanding of mathematical modeling | P | P, this description of math modeling is not explicit in the MLRs | N | intro paragraph 3, B (general statement), B4(8)d, C (general statement), D (general statement) | all levels | 3,4 | 2,3,4 |
| | | | | | | | |
| E. Successful students demonstrate active participation in the process of learning mathematics; they | | | | | | | |
| *Are willing to experiment with problems that have multiple solutions | N | | | | | affective domain | |
| *Demonstrate an understanding of the importance of the mathematical ideas behind the steps of a solution, as well as the solution | P | P, MLR includes "justifying" and "connecting"; nothing about importance | N | intro paragraph 3 | all levels | 2 | 2,3,4,5 |
| *Show an understanding of how to modify patterns and solutions strategies to obtain different results | P | P, nothing about different results | N | intro paragraphs 3 & 4, D (general statement) | all levels | 2,3,4 | 2,3,4 |
| *Recognize when a proposed solution does not work, analyze why and use the analysis to seek a valid solution | P | partial, problem-solving is throughout but no when "does not work" | N | intro paragraphs 3 & 4, A,B,C, D (general statements) | all levels | 2,3,4 | 2,3,4 |
| | | | | | | | |
| F. Successful students recognize the broad range of applications of mathematical reasoning. They have an appreciation of the relevance of mathematical models and know that mathematical applications are used in other fields. | P | P, broad range not stated, appreciate not included | N | intro, paragraph 3 & 4 | all levels | 2, affective | 2,3,4 |
| | | | | | | | |
| **II. Computation** | | | | | | | |
| A. Successful students know basic mathematical operations; they | | | | | | | |
| *Understand, perform and apply arithmetic operations with real numbers, and percents and proportions with and without a calculator | Y | Y | with and without calculator not explicit | A2(7), A3(7), A4(7), A1(9) | Y | 2,3 | 2,3,4 |
| *Understand percent, proportions, and ratios | Y | Y | N | A4(6)abc, A3(7), A4(7), | N | 2 | 2,3,4 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| *Understand exponents expressed as integer and rational numbers | Y | Y | N | A2(7)a, A1(8)a, A1(9)c | Y | 2 | 2,3,4 |
| *Understand integer exponents expressed as integer and rational numbers | Y | Y | N | A2(7)a, A1(8)a, A1(9)c | Y | 2 | 2,3,4 |
| *Interpret and write scientific notation and understand order of magnitude | Y | Y | N | A1(8)ab | N | 2 | 2,3 |
| *Understand the basic structure of the real number line | Y | Y | N | A2(8)abcd | N | 2 | 2,3,4 |
| *Understand absolute value | Y | Y | N | D2(9)d | Y | 2 | 3 |
| *Use the correct order of arithmetic operations, particularly demonstrating facility with the Distributive Law | Y | Y | N | A2(7)b | N | 3 | 3 |
| *Know terminology for, and relationships among, natural, integer, rational, irrational and real numbers | Y | Y | N | A1(7) ab, A2(8)abcd | N | 2 | 2,3,4 |
| **II. Computation** | | | | | | | |
| B. Successful students know and carefully record symbolic manipulations; they | | | | | | | |
| * Understand the uses of mathematical signs for equality, inequality, greater than, less than | Y | Y | N | assumed, explcit in D2(2), D3(8) | N | 2 | 2,3,4 |
| * Understand the uses of parentheses, superscripts and subscripts | P | P, no subscripts | N | A2(7)ab | N | 2 | 2,3 |
| * Write standard notations and convert calculator to standard notation | Y | Y | N | A1(8)b | N | 2 | 2,3,4 |
| | | | | | | | |
| **III. Algebra** | | | | | | | |
| A. Successful students know and apply basic algebraic concepts; they | | | | | | | |
| *Understand the concept of a variable | Y | Y | N | standard D | grades 4-D | 2 | 2,3,4 |
| *Correctly perform addition, subtraction, multiplication and division operations that include variables, with emphasis on grouping like terms | Y | Y, but not explicit on grouping | N | D1(8)ab, D1(9)abcd | Y | 3 | 3 |
| *Perform appropriate basic operations on sets (e.g., elements of subsets, union, intersection, and complements) | N | | | | | 3 | |
| *Use the distributive property to multiply a monomial by a polynomial and to multiply two polynomials | Y | Y | N | D1(9)b | Y | 3 | 3 |
| *Understand exponents, roots and their properties in expressions involving variables | Y | Y | N | D1(9)a | | | |
| *Understand the relationship between common and natural exponentials and logarithms | P | P, common only | N | D3(9)ab | Y | 2, 4 | 2,3,4 |
| *Simplify and perform basic operations on rational expressions, including finding common denominators: (add, subtract, multiply, divide) | P | common denom. not specified | N | D1(9)abd, D2(9)c, | Y | 3 | 2,3,4 |
| | | | | | | | |
| B. Successful students are able to work with mathematical notation to solve problems and communicate solutions; they | | | | | | | |

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|---|---|---|---|---|---|---|---|
| *Translate simple statements into equations | Y | Y | N | D1(4), D1(5), D1(6)ab; D1(7)ab, D5(9)a | no | 2,3 | 2,3 |
| *Understand the role of written symbols in representing mathematical ideas and the precise use of special symbols of mathematics as used in algebra | P | P, precise use of symbols not specified in MLRs | N | D1(4), D1(5), D1(6)ab; D1(7)ab, D2(9)ade, D4(9)a, D5(9)a | Y | 2 | 2,3,4 |
| | | | | | | | |
| C. Successful students use various appropriate techniques to solve and apply basic equations and inequalities, using algebraic, numeric and graphic methods—both with and without technology-—and are able to | | | | | | | |
| *Derive, solve, and interpret first degree equations and quadratic equations in one variable | Y | Y, note "with and without technology" assumed but not explicit | N | D2(8)abc, D2(9)b | Y | 3,4 | 2,3,4 |
| *Derive, solve, and interpret first degree inequalities in one variable | Y | Y, note "with and without technology" assumed but not explicit | N | D3(8)abc | N | 3,4 | 2,3,4 |
| *Derive, solve, and interpret systems of linear equations in two variables | Y | Y, note "with and without technology" assumed but not explicit | N | D2(8)c, D2(9)a | Y | 3,4 | 2,3,4 |
| | | | | | | | |
| D. Successful students distinguish between and among expressions, formulas, equations and functions; they | | | | | | | |
| *Understand the difference between simplifying, solving, substituting or evaluating equations and expressions | P | Differences between not explicit, no substituting | N | D1(8)ab, D1(9)a, D2(8)abc, D3(8)b, D2(9)abcdef, | Y | 2 | 2,3,4 |
| *Understand the concept of a function, including domain and range, and notation | Y | Y | N | D4(9)ab | Y | 2 | 2,3,4 |
| *Understand that functions can be expressed as verbal statements, numbers, formulae, graphs, and tables | Y | not in one place explicitly | N | D3(6)ab, D4(9)a | Y | 2 | 2,3,4 |
| | | | | | | | |
| E. Successful students understand the relationship between equations and graphs. | | | | | | | |

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| *They understand basic forms of the equation of a straight line and how to graph the line without the aid of a calculator | Y | Y, note "with and without calculator" assumed | N | D4(8)b, D4(9)a | Y | 2,3 | 2,3,4 |
| *They understand the basic shapes of the graphs of quadratic functions and know how to find the vertex of a parabola | P | P, vertex not explicitly stated | N | D4(9)a | Y | 2,3 | 2,3,4 |
| *They know and understand the basic shape of the graphs of exponential and logarithmic functions | P | exponential only, log scales only | N | D4(9)a | Y | 2,4 | 2,3,4 |
| | | | | | | | |
| **IV. Geometry** | | | | | | | |
| A. Successful students understand and use both basic plane and solid geometry; they | | | | | | | |
| *Understand the concepts of area, perimeter, volume and surface area | Y | Y | N | C2(4)abc, C3(5)abcd, | N | 2 | 2,3,4 |
| *Know how to calculate area, perimeter, volume and surface area | Y | Y | N | C2(4)abc, C3(5)abcd, C2(7)ab, C2(8)ab, C4(9)ab | N | 3 | 2,3,4 |
| *Use similar figures to understand the effects of scale on the figure and to find unknown angle measurements and lengths of sides | Y | Y | N | C3(7)abc, C1(9)b | Y | 3,4 | 2,3,4 |
| *Understand transformations and transformational geometry: rotation, translation, reflection, and dilation | Y | Y | N | C5(5)abc, C4(6)a, C3(7)abc | N | 2 | 2,3,4 |
| *Understand and apply the Pythagorean Theorem | Y | Y | N | C3(8), C1(9)cd | Y | 2,3 | 2,3,4 |
| | | | | | | | |
| B. Successful students know linear analytic (i.e. coordinate) geometry; they | | | | | | | |
| *Understand equations of lines | Y | Y | N | D3(7)c, D4(8)abc, D4(9)abc | Y | 2 | 2,3,4 |
| * Understand slope as a rate of change | Y | Y | N | D4(8)abc, D4(9)c | Y | 2 | 2,3,4 |
| | | | | | | | |
| **V. Data Analysis and Statistics** | | | | | | | |
| Successful students apply concepts of statistics and data analysis in the social and natural sciences. They know how to represent data in a variety of ways (e.g., scatter plot, line graph and two-way table) and select the most appropriate. They | | | | | | | |
| *Use various methods of data representation: tables, graphs, numbers | Y | Y | Y | B1(7)a | N | 3 | 3 |
| *Interpret data from various methods of representation | Y | Y | Y | B1(7)b | N | 2,3,4 | 2,3,4 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| *Understand mean, median, mode as measures of central tendency and their proper applications | Y | Y | N, MLR icludes quartiles | B3(6), B3(8) | N | 2 | 2,3,4 |
| *Understand the definition of probability and why probability events are expressed as between zero and one inclusive | Y | Y | N | B2(7)bc, B4(8)abc. B5(9)abc | N | 2 | 2,3,4 |
| *Understand data dispersion | Y | Y | N, MLR specifies SD, range, quartiles, MAD | B3(9)abc | Y | 2 | 2,3,4 |

| Count for categorizations of match | |
|---|---|
| Number Y | 40 |
| Number P | 20 |
| Number N | 2 |

| **In 2007 MLR, not in CRM 2006 in 9-D standards** |
|---|
| B2(9)abcd, B3(9)c, B4(9)abc, C3(9)abc, specific content C1(9)abcd; C2(9)ab |