

Unit 1: Sections 1.1 – 3.3 Skill Set

Section 1.1: Review of Functions

Assessment Item	Correlated MML Problems	Textbook
Find the domain and range of a function.	14, 17	13, 15, 19
Find a formula for and/or evaluate a composite function.	26, 39	23, 27, 29, 35
Express a function as a composite of one or more given functions.	31	34, 41, 43
Given a graph or table, determine the composite function values.	45	
Determine if an equation or function has symmetry about the x-axis, the y-axis, or the origin.	49	47
Given a graph, state whether the functions represented are even, odd, or neither.	53	
Simplify expressions given a function. <i>Expressions represent average rate of change.</i>		72, 75

Additional Suggested Problems: 3, 4, 5, 6, 11, 12, 30, 46, 54, 55

Section 1.2: Representing Functions

Assessment Item	Correlated MML Problems	Textbook
Find a formula for a function from its graph.	11	16
Graph a piecewise linear function.	18	19
Evaluate and find a formula for a slope function.		26
Given a graph, find an equation for a function by recognizing vertical and horizontal shifts.	29	
Graph a function by recognizing vertical and horizontal shifts.	30, 31, 35	33, 34, 37

Additional Suggested Problems: 2, 3, 7, 8, 9, 10, 41, 56, 60, 61

Section 1.3: Trigonometric Functions

For additional review, see *Just-In-Time Algebra and Trigonometry*, Chapters 7 and 11.

Assessment Item	Correlated MML Problems	Textbook
Evaluate trigonometric functions for basic angles without the use of a calculator.	9, 11, 13, 14	10, 12
Solve trigonometric equations.	23, 25, 28	24, 27
Given one trigonometric function value and an interval, evaluate the other five functions.	30, 32	

Additional Suggested Problems: 7, 17, 29, 46, 47

Section 2.1: The Idea of Limits

Assessment Item	Correlated MML Problems	Textbook
Find the average rate of change of a function over a given interval. (That is, find the slope of the secant line between two points on a curve.)	7	
Using technology, calculate the average velocity of shorter and shorter time intervals in order to estimate the instantaneous velocity at a given value of t .	9	12
Estimate solutions to applications using average velocities to approximate instantaneous velocity.	24	21, 23

Additional Suggested Problems: 1, 3

Section 2.2: Definitions of Limits

Assessment Item	Correlated MML Problems	Textbook
Given a graph, find the one-sided or two-sided limit of a function or explain why a limit does not exist.	7, 17, 19	10, 20
Using technology, calculate the value of a function closer and closer to a given input value in order to estimate the limit.	11, 13	26, 29
Given select function values and limit statements about a function, sketch a graph with the given properties.		24, 25

Additional Suggested Problems: 2, 5, 14, 21, 23, 30, 31, 36

Section 2.3: Techniques for Computing Limits

Assessment Item	Correlated MML Problems	Textbook
Find the limit of a function using the Limit Laws.	17, 23, 31, 39, 41, 44, 45, 47, 55, 57	16, 18, 25, 27, 43, 58, 60
Find the limit of a function using the Squeeze Theorem.	51	8, 50
Determine the value of an unknown constant for which the two-sided limit of a function will exist at a given input.	63	62
Use the factorization formula for $x^n - a^n$ to evaluate limits.	67	64, 66

Additional Suggested Problems: 7, 21, 33, 53, 69, 72, 74, 75, 77, 78

Section 2.4: Infinite Limits

Assessment Item	Correlated MML Problems	Textbook
Recognize and evaluate an infinite limit.	5, 17, 21, 27	19, 28
Given a graph, find the one-sided or two-sided limit of a function or explain why a limit does not exist.	11	9
Given select function values and limit statements about a function, sketch a graph with the given properties.	15	16
Find all vertical asymptotes of a rational function.	23	24

Additional Suggested Problems: 1, 2, 4, 33, 34, 36, 46

Section 2.5: Limits at Infinity

Assessment Item	Correlated MML Problems	Textbook
Find a limit at infinity of a function.	3, 9, 11, 21, 23, 27	12, 20, 26, 28
Determine if a limit statement implies the existence of a horizontal asymptote for a function. Give the horizontal asymptote of the function, if any.	(21, 23, 27)	(26, 28)
Find all vertical and horizontal asymptotes of a function.	33, 54b, 57b	32, 34, 37
Given select function values and limit statements about a function, sketch a graph with the given properties.	43	42
Find the oblique (or slant) asymptote of a function. Then, sketch a graph of the function including all asymptotes.	54ac, 56ac	

Additional Suggested Problems: 1, 2, 4, 5, 8, 31

Section 2.6: Continuity

Assessment Item	Correlated MML Problems	Textbook
Given a graph, determine the points at which the function has discontinuities.	9, 11	
Determine if a function is continuous at a point by definition.	15, 17	13, 16
Find the points (intervals) at which a function is continuous.	21, 29, 31, 35, 45	19, 33, 47
Determine one-sided continuity.	(31, 35)	(33, 47)
Use the Intermediate Value Theorem to show that an equation has at least one solution or a given number of solutions.	51	75a
Evaluate miscellaneous limits involving trigonometric functions.	65	61, 64, 66
Determine the value of a constant for which a function is continuous at a given input.	70	71
Verify or classify the discontinuities.	79, 81, 85	84

Additional Suggested Problems: 1, 2, 3, 7, 8, 55, 56, 59, 69

Section 3.1: Introducing the Derivative

Assessment Item	Correlated MML Problems	Textbook
Differentiate a function using one of the limit definitions at a specific x-value, i.e. find the slope of the tangent.	15a, 17a, 22a, 26a	12a, 27a
Differentiate a function using the limit definition.	29a, 50a	33
Find the equation for a tangent line to a curve at a given point.	15b, 17b, 22b, 26b, 29b, 50b	12b, 27b
Plot the graph of a function and the tangent line to the function at a given point.	15c, 29c	12c
Given a graph of a function, sketch a graph of its derivative.	39, 46c	42, 45c
Match the graph of a function with the graph of its derivative.	41	
Given a graph, find the values where a function is not continuous and find the values where it is not differentiable.	46ab	45ab
Given a graph, analyze the slope of the curve at given points.	53	54
Determine the location of vertical tangents for a function.	61, 63	

Additional Suggested Problems: 8, 9, 14, 32, 38, 55, 56, 58, 65, 69, 71, 72

Section 3.2: Rules of Differentiation

Assessment Item	Correlated MML Problems	Textbook
Find the derivative of a function using the differentiation rules.	7, 9, 19, 26, 29, 31	10, 16, 28, 34
Find the tangents to a curve at a given point. Then, graph the curve and the tangent line on the same set of axes.	37	35
Find all points where a function has tangent lines of a given slope.	39, 41	
Find higher-order derivatives of a function.	42	45
Given values for functions and their derivatives at a point, find the value of a derivative at that given point.	56	54

Additional Suggested Problems: 3, 4, 6, 47, 48, 49, 64

Section 3.3: The Product and Quotient Rules

Assessment Item	Correlated MML Problems	Textbook
Find the derivative of a function using the differentiation rules.	9, 18, 19, 23, 32, 35, 51	8, 10, 14, 26, 31
Find the tangents to a curve at a given point. Then, graph the curve and the tangent line on the same set of axes.	27	
Find all points where a function has tangent lines of a given slope.		39
Find higher-order derivatives of a function.	46	
Given values for functions and their derivatives at a point, find the value of a derivative at that given point.	58, 59	56, 57

Additional Suggested Problems: 4, 5, 45, 54, 55, 62, 65, 67