

## MAC 1105 - COURSE OBJECTIVES

Updated for F'09

Sec	Obj	Course Objectives (Optional text homework problems are also listed.) Primary homework problems are the on-line problems available at the russell eGrade site. (See Syllabus pg 2 for the web address.)
<b>A5</b>	<b>Hwk</b>	<b>1-11 odd</b>
	Pre 1	Preliminary Objective P1: Understand the relationship between $a - b$ and $b - a$ .
	Pre 2	Preliminary Objective P2: Factor quadratic trinomials
	1.	Rational Expressions
	a.	Equivalent Rational Expressions. (Class Examples)
	b.	Multiply or divide rational expressions; simplify. (Sec A5: Example 2)
	c.	Add or subtract rational expressions; simplify. (Sec A5: Examples 3-6)
	d.	Simplify mixed quotient. (Sec A5: Example 7)
<b>A6</b>	<b>Hwk</b>	<b>37, 39, 41, 43, 47, 57, 61, 63, 65</b>
	2.	Understand the meaning of rational exponents; simplify numbers raised to rational exponents. (Sec A6: Example 7)
	3.	Special Factoring Techniques
	a.	Factor by grouping. (refer to your class notes; may also refer to Sec A3: Example 3f)
	b.	Factor and simplify an expression containing rational exponents. (Sec A6: Example 10)
	c.	Factor and simplify an expression containing rational exponents and a common binomial factor. (Class Examples)
<b>CN</b>	<b>Hwk</b>	<b>Sec 1.3 1-51 every other odd; Sec 1.5 1-15 and 31-53 every other odd</b>
	4.	Solving Equations
	a.	Solve linear equations. (Refer to your class notes; may also refer to Sec A1: Examples 12)
	b.	Solve quadratic equations (including Quadratic Formula). (Refer to your class notes; may also refer to Sec 1.3: Algebraic solution of Example 6; Sec A2: Example 3)
	c.	Solve rational equations. (Class Examples)
	d.	Solve higher order equations. Understand the existence of real number roots. (refer to your class notes; may also refer to Sec A1: Example 13a)
	e.	Solve equations that contain even- or odd-root radicals. (Refer to your class notes; may also refer to Sec 1.3: Algebraic Solutions of Example 10)
	5.	Inequalities
	a.	Solve linear inequality. and express the solution in interval notation. (Refer to your class notes; may also refer to Sec.1.5: Examples 7, 8)
	b.	Express the solution to inequalities in interval notation. (Refer to your class notes; may also refer to Sec.1.5: Example 1)
	c.	Express the solution to inequalities in interval notation and understanding the terms "or" and "and". (Refer to your class notes.)
<b>1.1</b>	<b>Hwk</b>	<b>1, 21, 23, 31, 33, 49, 55, 57</b>
	6.	Rectangular Coordinate System
	a.	Understand plotting points on the Rectangular Coordinate System. (Sec 1.1: Figure 2, 3)
	b.	Recall and use the distance formula. (Sec 1.1: Example 2)
	c.	Recall and use the midpoint formula. (Sec 1.1: Example 5)
<b>1.2</b>	<b>Hwk</b>	<b>3, 7, 9; For 11, 19, 25, 27: sketch the graph by hand by making a table of values, find any intercepts; 31, 33, 37, 41, 47, 49, 51, 53, 54, 57, 59, 61, 63; For 65, 67, 69, 71, 73: find the intercepts, test for symmetry, you do not need to graph.</b>
	7.	General Graphing Principles
	a.	Understand what it means for a point (a,b) to be on the graph of an equation. (Sec 1.2: Example 1,2,9,10)
	b.	Identify intercepts from a graph or from an equation. (Sec 1.2: Example 4,5)
	c.	Symmetry
		Determine symmetry with respect to the x-axis, y-axis, or origin from a graph (Sec 1.2: Figure 27)
		Given a point on a graph, give the coordinates of a point that must also be on the graph if the graph is symmetric with respect to the x-axis, y-axis, or origin. (Sec 1.2: Example 7)
		Algebraically determine if the graph of an equation has any symmetry. (Sec 1.2: Example 8)

<b>1.6</b>	<b>Hwk</b>	<b>1-75 odd, 85, 87, 89</b>
	8.	Linear Equations
	a.	Calculate and interpret slope. (Sec 1.6: Example 1)
	b.	Graph lines by hand by obtaining the x- and y- intercepts or any two points. (Sec 1.6: Example 2, 3)
	c.	Identify the slope and y-intercept from the equation of a line. (Sec 1.6: Example 7)
	d.	Write the equation of a horizontal or vertical line. (Sec 1.6: Example 3, 5)
	d.	Write the equation of a line given two points on the line or given a point and the slope. (Sec 1.6: Example 4)
	e.	Write the equation for a linear relationship described in an applications problem. (Class Examples)
	f.	Write the equation of a line that goes through a given point that is parallel or perpendicular to a given line. (Sec 1.6: Example 9, 10, 11)
<b>1.7</b>	<b>Hwk</b>	<b>For 5, 7, 9, 11: Just write the standard form; 15, 17 (You will not be asked to complete the square and obtain the general form of the equation of a circle.)</b>
	9.	Identify the center and radius and graph a circle when given the equation in standard (center-radius) form. (Sec 1.7: Examples 1,2)
<b>2.1</b>	<b>Hwk</b>	<b>1, 3, 5, 9, For 13, 15, 17, 19: add g) find f(3a); 21-32 all, 33, 35(omit c), 37-45 odd, 46, 47, 49-62 all, 67, 69</b>
	10.	Functions
	a.	Identify the graph of a function; determine whether a relation represents a function. (Sec 2.1: Examples 1,2,7)
	b.	Find value of a function. (Sec 2.1: Example 4)
	c.	Find the domain and range of a function from a graph. (Sec 2.1: Example 8)
	c.	Find the domain of a function from the equation of the function. (Sec 2.1: Example 6)
	d.	Obtain information from and about the graph of a function. (Sec 2.1: Examples 8,9)
<b>2.3</b>	<b>Hwk</b>	<b>1-7 odd, 9, 11, 13, 15, 19, 25, 31, 33, 37, 39, 41-49 odd, 55, 63, 65, 71</b>
	11.	Properties of Functions
	a.	From a graph, identify intervals where a function is increasing, decreasing, or constant. (Sec 2.3: Example 3)
	b.	From a graph, identify local maximums or local minimums and where they occur. (Sec 2.3: Figure 24)
	c.	Find the average rate of change of a function. (Sec 2.3: Example 2)
	d.	Find the slope of the secant line containing $(x, f(x))$ and $(x + h, f(x + h))$ on the graph of a function $y = f(x)$ . (Sec 2.3)
	e.	Determine, from a graph or from an equation, whether a function is even or odd. (Sec 2.3: Example 5,6)
	12.	Recognize the graph, equation, and properties, of any of the basic functions in the Library of Functions (except Greatest-Integer). (Sec 2.3)
	13.	Functions defined Piecewise
	a.	Evaluate a function defined piecewise. (Sec 2.3: Example 7)
	b.	Graph a function defined piecewise. (Sec 2.3: Example 7)
<b>2.4</b>	<b>Hwk</b>	<b>1-23 odd, 29-43 odd, 59, 61, 63,</b>
	14.	Graphing with Reflections, Compressions/Stretching, Translations
	a.	Identify reflections about the x- or y-axis; graph a function reflected about either axis. Understand the affect of a reflection about a coordinate axis on the coordinates of a point on a graph or on the domain or range of the function. (Sec 2.4: Figure 46)
	b.	Identify compressing or stretching factors from an equation; graph a function with these. Understand the affect of a compressing or stretching factor on the coordinates of a point on a graph or on the domain or range of the function. (Sec 2.4: Example 3)
	c.	Identify vertical or horizontal translations from an equation; graph a function with these. (Sec 2.4: Example 1,2)
<b>2.5</b>	<b>Hwk</b>	<b>1-9 odd, 13-27 odd, 31, 33, 37, 47, 49, 51</b>
	15.	Form the sum, difference, product, or quotient of two functions; evaluate; give the domain of the new function. (Sec 2.5: Example 1)
	16.	Function Composition
	a.	Form the composite of two functions; evaluate a composite function. (Sec 2.5: Examples 2, 4)
	b.	Find the domain of a composite function. (Sec 2.5: Example 3)
<b>2.6</b>	<b>Hwk</b>	<b>1a, 3a</b>
	17.	Construct and analyze functions and math models. (Sec 2.6: Examples 1-5)

<b>3.1</b>	<b>Hwk</b>	<b>1-7 odd, 13-21 odd, 25, 29, 35, 37, 39, 41, 43, 43, 49, 53, 57, 59, 61, 63, 65, 67, 71, 73, 75 abc</b>
	18.	Quadratic Functions
	a.	Given a quadratic function in the form $y = ax^2 + bx + c$ , find the vertex, all intercepts, and sketch the graph by hand. (Sec 3.1: Examples 1 – 5)
	b.	Given a quadratic function in the form $y = a(x - h)^2 + k$ , find the vertex, all intercepts, and sketch the graph by hand. (Apply graphing translations from Sec 2.4)
	c.	Obtain the quadratic function needed to solve an applications problem; find the maximum or minimum value of a quadratic function. (Sec 3.1: Example 7-10)
<b>3.2</b>	<b>Hwk</b>	<b>Figure 19 and 20</b>
	19.	Power Functions
	a.	Graph a power function by hand; give domain and range and identify intervals where increasing or decreasing. (Sec 3.2: Figure 19, 20)
<b>3.8</b>	<b>Hwk</b>	<b>Solve algebraically. 1, 3, 9, 11 17, 25, 27, 33, 39, 41, 45, 47, 49, 53</b>
	20.	Polynomial and Rational Inequalities
	a.	Solve a polynomial inequality algebraically. (Sec 3.8: Example 1, 2)
	b.	Solve a rational inequality algebraically. (Sec 3.8: Example 3)
	c.	Given a rational inequality, find the rational inequality needed to identify partitioning values. (Class Examples.)
<b>4.1</b>	<b>Hwk</b>	<b>1, 3, 5, 9, 11, 15, 17, 19; For 21, 25, 27: verify and graph.; For 29: just verify; 33, 35, 37, 39, 41; For 47, 49, 53: just find the inverse</b>
	21.	Inverse Functions
	a.	Determine whether a function is one-to-one by looking at a graph or set of ordered pairs. (Sec 4.1: Example 2)
	b.	Given the graph of a one-to-one function, draw the graph of the inverse function. (Sec 4.1: Example 4)
	c.	Use composition to determine if two functions are inverses. (Sec 4.1: Example 6)
	d.	Given an equation of a function, find an equation of the inverse function, $f^{-1}$ . (Sec 4.1: Example 6, 7)
<b>4.2</b>	<b>Hwk</b>	<b>For 11-18 omit D, H, G, do 11, 12, 15-17; For 19-24 omit F, do 19, 21-24; 25, 27, 37, 39, 41; and 4.5: 19,31</b>
	22.	Exponential Functions
	a.	Given an exponential function, give the domain, range, intervals where increasing or decreasing, find intercepts when possible, sketch the graph by hand. (Sec 4.2: Example 2, 3)
	b.	Given an exponential function with a translation, give the domain, range, intervals where increasing or decreasing, find intercepts when possible, sketch the graph by hand. (Sec 4.2: Example 4,5)
	c.	Use a calculator to evaluate exponential expressions, including applications problems. (Sec 4.2: Example 1)
	d.	Solve exponential equations by obtaining the same base. (Sec 4.5, Example 4)
<b>4.3</b>	<b>Hwk</b>	<b>1-21 every other odd, 25-49 odd, For 53-60 omit D, G, H, do 53, 54, 57-59; For 61-66 omit E, F, do 61, 63, 65, 66; 67-73 odd,</b>
	23.	Logarithmic Functions
	a.	Evaluate logarithmic functions exactly. Identify when logarithmic functions are defined and when not defined. (Sec 4.3: Example 4)
	b.	Given a logarithmic function, give the domain, range, intervals where increasing or decreasing, find intercepts when possible, sketch the graph by hand. (Sec 4.3: Figure 25)
	c.	Given a logarithmic function with a translation, give the domain, range, intervals where increasing or decreasing, find intercepts when possible, sketch the graph by hand. (Sec 4.3: Example 6, 7)
	d.	Find the domain of a logarithmic function. (Sec 4.3: Example 5)
<b>4.4</b>	<b>Hwk</b>	<b>1-31 odd, 35,41</b>
	24.	Properties of Logarithms
	a.	Understand when and how to apply basic logarithm properties. (Sec 4.4: Examples 1,2)
	b.	Understand the inverse function relationship between exponential and logarithmic functions. Simplify expressions using this relationship. (Sec 4.4: Example 2)
	c.	Write a logarithmic expression as a sum or difference of logarithms. (Sec 4.4: Example 3, 4, 5) Write a logarithmic expression as a single logarithm. (Sec 4.4: Example 6)

<b>4.5</b>	<b>Hwk</b>	<b>1-11 odd, 15-23 odd, 31-39 odd, 45-53 odd</b>
	25.	Solve Exponential Equations
	a.	Solve exponential equations algebraically. (Sec 4.5: Example 7,8,9)
	b.	Solve exponential equations algebraically when base is $e$ or 10. (Class Examples)
	26.	Solve Logarithmic Equations
	a.	Solve logarithmic equations algebraically. (Sec 4.5: Example 2)
	b.	Solve logarithmic equations algebraically using the definition of logarithms. (Sec 4.5: Example 1, 3)
	27.	Solve other kinds of equations involving exponential functions. (Class Examples)
	28.	Solve other kinds of equations involving logarithmic functions. (Class Examples)
<b>4.6</b>	<b>Hwk</b>	<b>1, 13, 29, 31, 33, 37</b>
	29.	Compound Interest
	a.	Future Value or Present Value with quarterly or monthly compounding. (Sec 4.6: Examples 1,3, 4, 5)
	b.	Future Value or Present Value with continuous compounding. (Sec 4.6: Examples 3, 4, 5)
	c.	Determine time required to double or triple an amount of money. (Sec 4.6: Example 7)
<b>10.1</b>	<b>Hwk</b>	<b>3, 11, 15, 17, 21, 25</b>
	30.	Solve, algebraically, 2 linear equations in 2 unknowns; interpret the solution graphically. (Sec 10.1: Example 4-9)
<b>10.7</b>	<b>Hwk</b>	<b>1, 5, 11</b>
	31.	Solve, algebraically, a system of nonlinear equations in two unknowns. (Sec 10.7: Examples 1,2)
<b>10.8</b>	<b>Hwk</b>	<b>1, 3, 9, 11, 13, 21, 23</b>
	32.	Linear Inequalities
	a.	Graph a linear inequality. (Sec 10.8: Examples 1, 3)
	b.	Graph a system of linear inequalities. (Sec 10.8: Examples 4,6-9)