Math 103 – Intermediate Algebra
Final Exam Review Sheet
Winter 2023

The final exam covers Sections 2.1, 2.3-2.7, Sections 3.2-3.6, Sections 4.1-4.4, Section 5.1-5.3, Ch 6, Ch 7, Ch 8, Ch 9, and Ch 10.

Make sure you read all the directions on the final exam. You will have some choices on the problems that you solve. For example, the directions for a group of problems may state "Do any 4 of the following 5 problems."

You will have a problem from Section 10.5 that you must solve.

Expressions

Exponential Expressions

- ☐ Be able to simplify an expression using the properties of exponents. (Sections 5.2 & 8.3)

Polynomials

- ☐ Know how to write a polynomial in standard form. (Section 5.1)
- ☐ Be able to add, subtract, and multiply polynomials. (Sections 5.1 & 5.3)
- ☐ Know how to factor polynomials. (Sections 6.1-6.4)

Rational Expressions

- ☐ Know how to simplify a rational expression. (Section 7.1)
- ☐ Be able to add, subtract, multiply and divide rational expressions. (Sections 7.1 & 7.2)
- ☐ Be able to simplify a complex rational expression. (Section 7.3)

Radical Expressions and Rational Exponents

- ☐ Know how to simplify expressions with roots. (Section 8.1)
- ☐ Know how to simplify radical expressions. (Section 8.2)
- ☐ Be able to rewrite a radical expression using rational exponents and vice versa. (Section 8.3)
- ☐ Be able to add, subtract, multiply, and divide radical expressions. (Sections 8.4 & 8.5)
- ☐ Know how to rationalize the denominator of a radical expression and simplify. (Section 8.5)
- ☐ Know how to evaluate the square root of a negative number. (Section 8.8)
- ☐ Know how to write a complex number in standard form. (Section 8.8)
- ☐ Be able to add, subtract, and multiply complex numbers (Section 8.8)

Logarithmic Expressions

- ☐ Be able to evaluate a logarithmic expression. (Section 10.3)
- ☐ Be able to use the properties of logarithms to expand or condense a logarithmic expression. (Section 10.4)

Equations

Linear Equations

- ☐ Be able to solve a linear equation. (Section 2.1)

Absolute Value Equations

- ☐ Be able to solve an absolute value equation. (Section 2.7)

Polynomial Equations

- ☐ Be able to solve a polynomial equation by factoring. (Section 6.5)

Rational Equations

- ☐ Be able to solve rational equations and check for extraneous solutions. (Section 7.4)

Radical Equations

- ☐ Know how to solve a radical equation that contains one radical or two radicals and check for extraneous solutions. (Section 8.6)

Quadratic Equations

- ☐ Know how to solve a quadratic equation using factoring, the Square Root Property, completing the square, and the Quadratic Formula. (Sections 9.1-9.3)
- ☐ Be able to solve an equation of quadratic form. (Section 9.4)

Exponential and Logarithmic Equations

- ☐ Be able to solve exponential equations. (Sections 10.2 & 10.5)
- ☐ Be able to solve logarithmic equations and check for extraneous solutions. (Sections 10.3 & 10.5)

Systems of Equations

- ☐ Be able to solve a system of linear equations in two variables by the method of substitution and the method of elimination. (Section 4.1)
- ☐ Be able to solve a system of linear equations in three variables. (Section 4.4)

Inequalities

Linear Inequalities

- ☐ Be able to solve a linear inequality. (Section 2.5)
- ☐ Be able to sketch the graph of the solution to a linear inequality in two variables. (Section 3.4)

Compound Inequalities

- ☐ Be able to solve compound inequalities and graph the solutions sets on the real number line. (Section 2.6)

Absolute Value Inequalities

- ☐ Be able to solve absolute value inequalities and graph the solution sets on the real number line. (Section 2.7)

Quadratic and Rational Inequalities

- ☐ Be able to solve rational inequalities and graph the solution sets on the real number line. (Section 7.6)
- ☐ Be able to solve quadratic inequalities and graph the solution sets on the real number line. (Section 9.8)

Relations and Functions

- ☐ Be able to find the domain and range of a given relation or function. (Sections 3.5 & 3.6)
- ☐ Be able to determine whether a given relation is a function. (Section 3.5)
- ☐ Know how to use the vertical line test. (Section 3.6)
- ☐ Know how to use function notation and be able to evaluate a function. (Section 3.5)
- ☐ Be able to sketch the graphs of basic functions. (Section 3.6)

Lines

- ☐ Be able to sketch the graph of a line. (Section 3.2)
- ☐ Know how to write the equation of a line in three different forms: slope-intercept form, point-slope form, and standard form. (Section 3.3)
- ☐ Know how to find the equation of a line which satisfies various conditions. (Section 3.3)
- ☐ Know the relationship between the slopes of parallel lines. (Section 3.2)
- ☐ Know the relationship between the slopes of perpendicular lines. (Section 3.2)

Quadratic Functions

- ☐ Given a quadratic function, know how to find if the parabola opens upward or downward, the axis of symmetry, the vertex, the intercepts and be able to sketch the graph. (Sections 9.6 & 9.7)
- ☐ Know how to write a quadratic function in standard form and find the vertex of its graph. (Section 9.7)

Exponential and Logarithmic Functions

- ☐ Be able to sketch the graphs of an exponential function and transformations of the graph and identify the horizontal asymptote. (Section 10.2)
- ☐ Be able to sketch the graph of a logarithmic function and identify the vertical asymptote. (Section 10.3)

Composite, Inverse and One-to-One Functions

- ☐ Given two functions, be able to find the composition at a given *x*-value. (Section 10.1)
- ☐ Be able to find $(f \circ g)(x)$, $(g \circ f)(x)$, and $(f \cdot g)(x)$ given $f(x)$ and $g(x)$. (Section 10.1)
- ☐ Know the definition of a one-to-one function and how to use the horizontal line test to determine if a function is one-to-one. (Section 10.1)
- ☐ Know the definition of an inverse function and how to find the inverse function of a one-to-one function. (Section 10.1)
- ☐ Be able to graph a function and its inverse function on the same set of axes. (Section 10.1)

Formulas and Applications

- ☐ Be able to solve a formula for a specific variable (Section 2.3)
- ☐ Be able to use formulas to solve geometry applications. (Section 2.3)
- ☐ Be able to solve mixture word problems and uniform motion applications. (Section 2.4)
- ☐ Be able to translate an application to system of equations and solve. (Sections 4.2-4.4)
- ☐ Be able to solve applications involving evaluating a polynomial function. (Section 5.1)
- ☐ Be able to solve applications modeled by quadratic equations. (Sections 6.5 & 9.5)
- ☐ Be able to solve applications involving variation: direct and inverse. (Section 7.5)
- ☐ Be able to solve applications that involve setting up and solving a rational equation. (Section 7.5)
- ☐ Be able to solve applications that involve finding the maximum value or minimum value of a quadratic function. (Section 9.6)
- ☐ Be able to solve applications involving an exponential or logarithmic model. (Sections 10.2, 10.3 & 10.5)
  (The compound interest formulas, the exponential growth and decay formula, and the decibel level formula will be given, if needed.)