Final Exam Topics

The following is a list of ideas/concepts that may or may not show up on the final exam. Note that this list may not be complete.

1.1: Variables and Constants

- Definitions: variable, constant, natural numbers, integers, rational numbers, irrational numbers, real numbers, numerator, denominator, mean

- Be able to identify a variable or a constant written algebraically or in context of a given situation

- Be able to identify what type of number you are given

- Be able to plot numbers on a number line

- Be able to compute the mean of a set of data

- Be able to interpret a value for a variable in context (i.e. If g = gallons of gas used, then what does $g = 5$ mean?)

1.2: Scattergrams

- Definitions: ordered pair, coordinate, axes, independent variable, dependent variable

- Be able to identify which variable is independent and which variable is dependent

- Be able to identify the x-coordinate or the y-coordinate in a table, ordered pair, or scattergram

- Be able to describe what an ordered pair represents in context of the given situation

- Be able to create/read a scattergram of data given

1.3: Exact Linear Relationships

- Definitions: linearly related, linear model, input, output, x-intercept, y-intercept

- Be able to identify inputs and outputs for a given situation, ordered pair, table, or graph

- Be able to identify the x or y intercept(s) given a table or graph

- Be able to describe what the x or y intercept(s) mean in a given situation

- Be able to determine if data is linearly related

- Be able to fit a linear model to a set of data

1.4: Approximate Linear Relationships

- Definitions: approximately linearly related, interpolation, extrapolation, model breakdown

- Be able to determine if data is linearly related or approximately linearly related

- Be able to fit a model to data that is approximately linearly related

- Be able to use the graph of a model to determine when certain inputs or outputs happen

- Be able to determine if interpolation or extrapolation is used to determine a specific output

- Be able to determine if results found from using a model are overestimates or underestimates

- Be able to determine when or if model breakdown will occur

2.1: Expressions

- Definitions: expression, product, quotient, sum, difference

- Be able to identify an expression

- Be able to identify which variables/constants are used in expressions

- Be able to use words to describe an algebraic expression

- Be able to use an algebraic expression to describe words

- Be able to determine an expression to describe a given situation

2.2: Operations with Fractions

- Definitions: prime number, simplified (for a fraction), reciprocal

- Be able to write a number as a product of prime factors

- Be able to add, subtract, multiply, and divide positive rational numbers

- Understand what it means to multiply by 0 or by 1

- Understand that you can not divide by 0

2.3/2.4: Adding/Subtracting Real Numbers

- Definitions: opposites, absolute value, change in quantity

- Be able to find the opposite of a number

- Be able to find the absolute value of a number

- Be able to add/subtract real numbers (know how to handle negatives)

- Be able to find the change in quantity for a given situation

- Understand what it means to get a positive/negative change in quantity

2.5: Ratios, Percents, and Multiplyin and Dividing Real Numbers

- Definitions: ratio, unit ratio, percent

- Be able to find and interpret the ratio for two quantities or a given situation

- Be able to find and interpret the unit ratio for two quantities or a given situation

- Be able to convert a percentage to a decimal

- Be able to convert a decimal to a percentage

- Be able to find what percent of the whole a certain portion represents

- Be able to determine how much is needed to equal a certain percentage of a given amount

- Be able to multiply and divide real numbers (know how to handle negatives)

2.6: Exponents and Order of Operations

- Definitions: exponent, base

- Be able to compute powers of numbers

- Be able to identify an exponent or a base when appropriate

- Be able to simplify expressions using arithmetic operations done in the correct order

3.1: Graphing Equations of the Form $y = mx + b$

- Definitions: equation, solution, solution set, graph

- Be able to identify equations

- Be able to identify whether an ordered pair is a solution to an equation

- Be able to graph a line using a table and a given equation

- Understand that graphs of equations of the form $y = mx + b$ and $x = a$ are lines

- Understand that b represents the y-intercept

- Understand how the sign of m affects the line

3.2: Graphing Linear Models; Unit Analysis

- Definitions: unit analysis

- Be able to use the rule of four on a given situation

- Be able to find an equation for a linear model

- Be able to perform a unit analysis on a linear model

3.3: Slope of a Line

- Definitions: slope, increasing, decreasing

- Be able to compute the slope of a line given two points on the line

- Be able to find an equation for a line given two points and a y-intercept

- Be able to find an equation for a line using the slope and the graph of the line

- Understand that the slope is a ratio of rise to run, and thus is a measure of steepness

- Be able to compare slopes of lines given only the graphs

- Be able to sketch a line with given conditions on the slope and/or y-intercept

3.4: Using Slope to Graph Linear Equations

- Definitions: parallel, perpendicular

- Be able to graph a line given the equation and using the slope and y-intercept

- Be able to graph a line given the slope and a point on the line

- Be able to identify lines as either parallel, perpendicular, or neither.

- Be able to find an equation for a line parallel to a given line

- Be able to find an equation for a line perpendicular to a given line

3.5: Rate of Change

- Definitions: rate of change, average rate of change

- Be able to compute the rate of change of y with respect to x

- Be able to determine whether a rate of change represents a constant rate of change or an average rate of change

- Be able to interpret the rate of change in context of the situation

- Understand that slope is a constant rate of change

- Be able to determine if a table represents a line by using the idea of slope as a constant rate of change

4.1: Commutative, Associative, and Distributive Laws

- Definitions: simplified (expressions)

- Be able to use the associative, commutative, and distributive laws to simplify an expression

- Be able to show an expression or equation is false

4.2: Simplifying Expressions

- Definitions: coefficient, like terms

- Be able to simplify an expression

- Be able to turn a statement in words into an expression and then simplify it

4.3: Solving Linear Equations in One Variable

- Definitions: linear equation in one variable, solution, solution set, solve, equivalent equations,

- Be able to solve linear equations in one variable

- Be able to determine if a value is a solution to a given equation

- Be able to determine a solution using a graph

- Be able to set up equations and find solutions to real life examples

4.4: Solving More Linear Equations in One Variable

- Definitions: conditional equation, identity, inconsistent equation (contradiction)

- Be able to eliminate fractions or decimals to come up with an easier equivalent equation to solve

- Be able to determine if an equation is conditional, an identity, or inconsistent

4.5: Comparing Expressions and Equations

- Be able to determine if a given is an expression or an equation

- Be able to solve or simplify based on what is given

4.6: Formulas

- Definitions: perimeter

- Be able to determine the perimeter of any given polygon

- Know and be able to use the formulas for the

    - Area of a rectangle
    - Total Value
    - Area of a Right Triangle

- Be able to create a formula for a given situation

5.1: Graphing Linear Equations

- Be able to find the x and y intercepts of a line

- Be able to graph a line using its intercepts

5.2: Functions

- Definitions: relation, domain, range, function

- Be able to interpret any representation of a relation

- Be able to find the domain of a relation

- Be able to find the range of a relation

- Understand that the domain is related to the inputs

- Understand that the range is related to the outputs

- Be able to determine if a relation is a function

- Be able to use the Vertical Line Test to determine whether or not a relation is a function

- Be able to come up with a graph of a relation that satisfies a given domain and range

5.3: Function Notation

- Be able to write an equation in function notation

- Be able to use function notation to identify the independent and dependent variables

- Understand function notation as a command

- Be able to relate function notation to the graph of the function

5.4: Finding Linear Equations

- Definitions: slope-intercept form, point-slope form, piecewise function

- Be able to write the equation of the line in slope-intercept form given certain information

- Be able to write the equation of the line in point-slope form given certain information

- Be able to graph a piecewise function

- Be able to find the domain and range of a piecewise function using its graph

- Be able to find outputs of a piecewise function given its graph

- Be able to find outputs of a piecewise function given specific inputs

6.1: Solving Systems by Graphing

- Definitions: system of linear equations in two variables, solution to a system, inconsistent, dependent

- Be able to solve a system of linear equations by graphing

- Be able to solve a system of linear equations using a table

- Be able to identify a system as inconsistent or dependent when appropriate

- Understand that a solution to a system is an ordered pair

- Understand graphically what it means for a system to be inconsistent/dependent

6.2: Solving Systems by Substitution

- Be able to solve a system of linear equations using substitution

- Be able to state the solution set of any given system using substitution

- Be able to identify a system as inconsistent or dependent when appropriate

6.3: Solving Systems by Elimination

- Be able to solve a system of linear equations using elimination

- Be able to state the solution set of any given system using elimination

- Be able to identify a system as incosistent or dependent when appropriate

6.4: Modeling with Systems

- Be able to construct a system that models a given situation

- Be able to interpret the solution of a system in context of the situation at hand