Wilfrid W. Csaplar Jr. College Algebra Review Sheet for Exam 4

This review sheet is intended to cover everything that could be on the exam; however, it is possible that I will have accidentally left something off. You are still responsible for everything in the chapters covered except anything that I explicitly say you are not responsible for. Therefore, if I left something off of this sheet, it can still be on the exam. There will be no multiple-choice questions. Most of the questions will be like the ones in the homework assignments, and possibly a few definition questions, but I am more likely to ask questions that make you use the definitions rather than recite them. I will probably ask one of the questions from the book at the end of the chapters.

The review session will be at a time to be determined in class, probably Sunday 10/25.

Chapter 2.1: Know how to calculate **slope**. **m** = $(y_1-y_0)/(x_1-x_0)$ *Hint: rise over run.* Understand what the sign and size of the slope are telling you. *+ slopes up and - slopes down. Large |m| is steep and small |m| is flat.* Know how to get the **point-slope form** and the **slope-intercept form**. Be able to plot both and get from one of them to the other. Be able to understand what the slope means. For example, Page 154, Question #2 and Page 158, Question #5 both ask to "interpret" the slope. *Hint: it means how much the Y variable changes when the X variable changes one unit.* Know that the **average rate of change over [a, b]** is the slope of the **secant** between the points (a, f(a)) and (b, f(b)).

Chapter 2.2: Know the **absolute value, |x|**, is x if $x \geq 0$ and -x if $x<0$. Know the following rules, **product rule, power rule,** and **quotient rule**. *These are common sense, $|ab|=|a||b|$, $|a^n|=|a|^n$ and $|a/b| = |a|/|b|$.* The **equality properties** are logical. *$|x|=0$ if and only if $x=0$. If $|x| = c$, then $x = \pm c$ if $c>0$ and cannot be solved if $c<0$. Do not forget to do ± when solving the equation. When it comes to plotting absolute value functions, it is usually easiest if you break it into a piecewise function. Have the domains of the pieces start and/or end at the values of x which make the inside of the absolute value = 0. For example, $|x-3|$ will have one piece end at x=3 and the other one starts there. Then do the transformations like in the previous exam. Be careful about the domain. For example, $f(x)=|x|/x$ is not defined at x=0, but looks like it = -1 or 1. If you have two absolute values in an equation, you need to break it up into 3 sections. For example, $f(x) = |x-a| +|x-b|$ will have three sections for the domain $(-\infty, a)$, $[a, b)$, and $[b, \infty)$ assuming $a<b$.*

Chapter 2.3: Know both the **general form** and the **standard form** of the **quadratic equation**. *The former is $f(x) = ax^2 + bx +c$ and the latter is $f(x) = a(x-h)^2 + k$. Note that it is -h but +k. That is because of the way that transformations of functions involving changes in x go the opposite of what you think.* The **vertex** is (h, k). Be able to convert from one form to the other. Be able to plot the function by finding the vertex and using the transformations from the previous exam. Note that the vertex = (-b/2a, f(-b/2a)). *Note that the maximum or minimum of a quadratic function is the vertex.* The **quadratic formula** can be used to find the zeros of the function, in other words, the x-intercepts. Note: if the **discriminant** = 0, $x = \dfrac{-b \pm \sqrt{b^2 - 4ac}}{2a}$ then x = -b/2a which is the vertex and there is only one real solution. If the discriminant is <0 then there are no real solutions. If the discriminant is >0, then there are two real solutions. I plan to ask some word problems.

Chapter 2.4: Understand what $f(x) < g(x)$ and $f(x) > g(x)$ mean and how to see them on a graph. Memorize **Theorem 2.4** on Page 211. *The first one, if $c > 0$ then $|x| < c$ means $-c < x < c$, implies the second one. (Replace < with $\leq$.) It also implies the fourth and fifth because > is the opposite of < so, we get the opposite results. The other two ($c \leq 0$) make logical sense. Make sure that you break up the inequality in the appropriate manner before trying to solve. If in the proces of solving, you multiply or divide by a negative number, reverse the inequality.* For **solving quadratic inequality**, first rewrite it as $f(x)$ on one side of the inequality and 0 on the other side. Find the zeros of the function. Choose a **test value** in each section and test them for the sign. Then figure out which areas hold.

Non-graded Homework Assignment #21A to be reviewed with Assignment #21.

On Page 220, Questions 26, 31-33-36, 38-42