Wilfrid W. Csaplar Jr. College Algebra Review Sheet for Exam 3

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 10/4.

Chapter 1.5: Understand how to do **sum, difference, product,** and **quotient** of functions, which are (f+g)(x), (f-g)(x), (fg)(x), and (f/g)(x) respectively. Understand the **difference quotient** which is given to the right. *For the first term, remember to replace x with* $\frac{f(x+h)-f(x)}{h}$ *(x+h). The parentheses are very important because if* $f(x) = x^2$ *you get* $(x+h)^2 \neq x^2 + h^2$. Simplify the whole equation as much as possible. Know the common economic functions, but with the correct notation. *(The book uses non-standard notation, and I will use standard notation.)* I will write **price function** as P(Q); **revenue function** as R(Q); **cost function** as C(Q); **average cost** as $\overline{C}(Q)$; and the **profit function** as $\Pi(Q)$ where Q is quantity. Make sure you understand what those functions evaluated at different values mean, especially at Q=0. Also, make sure you understand the interpretation of the result from setting the function =0. I guarantee there will be a question on this topic on the test.

Chapter 1.6: Understand the **graphing principles**. In particular, **y=f(x)**. Do the following steps in the following order. 1) Find the y-intercept if x=0 is in the domain. 2) Find the x-intercepts a.k.a. **zeros of the function**, if they exist. 3) If the intercepts indicate there could be symmetry, test for **symmetry** by putting -x in for x in the function. If you find either symmetry then you only have to find the values for positive xs and you have the values for the function when x is negative. If there is Y-axis symmetry, then it is **even**. If there is symmetry about the origin, then it is **odd**. 4) Find the values for f(x) at the ends of the domain and at any holes in the domain. 5) Find enough other points to be able to plot it well. If the domain has intervals or holes in it, then find the value of f at one or more values of x inside the interval. Normally you will need at least two per interval. Understand **increasing, decreasing,** and **constant** functions. **Local maxima** are where points on either side of it have the same y value or a smaller y. *Test constant function points and the end points of the domain.* **Local minima** are where points on either side of it have the same y value or a larger y. *Test constant function points and the end points of the domain.* **Global maximum** (the book calls the maximum) is the highest of the local maxima and the **global minimum** (the book calls a minimum) is the lowest of the local minima.

Chapter 1.7: Know what a **transformation** is. A **vertical shift** is y = f(x) + k. *If k is positive the line shifts up k units. If k is negative, then it shifts down k units.* A **horizontal shift** is when y = f(x+h). *If h is positive the line shifts left h units. If h is negative, then it shifts right h units. Horizontal shifts go the opposite of what you would expect.* Know how to do **reflections**. *If y =*

-f(x), then flip everything over the x-axis by changing the signs on the values of y. If y = f(-x), then flip everything over the y-axis by changing the signs on the values of x. **Vertical scalings** are when y = af(x). If a>1, then f is **vertically stretched, vertical expansion,** or **vertically dilated.** If 0<a<1, then it is **vertically shrunk, vertically compressed, or vertical contraction**. *Basically, multiply all y values by a.* **Horizontal scaling** is when y = f(bx). If 0<b<1, then f is **horizontally stretched, horizontally expanded, or horizontally dilated.** If b>1 then f is **horizontally shrunk, horizontally compressed, or horizontally contracted.** *Note that you divide all of the x coordinates by b. Horizontal stretching goes the opposite of what you expect.* In general, if g(x) = Af(Bx+H)+K, then do the transformations in the following order. 1) Subtract H from the x coordinates. 2) Divide the x coordinates by B. Multiply the y coordinates by A, then add K to the Y coordinate.

Non-graded Homework Assignment #15A to be reviewed with Assignment #15.

On Page 141, Do #37, 49, 50-53