Section 2.5: Continuity

(1) What is the definition of a function being continuous at a number a? What three things to to be true this to happen?

(2) For each of the three ways to fail above we get a different type of discontinuity.

(a) If the function is not continuous at $x = a$ because $f(a)$ is undefined, what type of discontinuity do we get? Illustrate with a graph.

(b) If the function is not continuous at $x = a$ because the limit does not exist because the left hand and right hand limits are not equal, what type of discontinuity do we get? Illustrate with a graph.

(c) If the function is not continuous at $x = a$ because the limit does not exist because (at least) one side approaches infinity, what type of discontinuity do we get? Illustrate with a graph.

(3) What does it means for a function to be continuous from the left at $x = a$? Continuous from the right? How can you tell if a piecewise function is continuous from the left or right?

(4) For non-piecewise defined functions, the standard ones are defined at every point in their domain. The big three things we need to remember is that we can't divide by 0, can't take the square (or other even) root of a negative number and can't take the log of 0 or a negative. For piecewise functions, you need to check that the functions meet up where the functions change. Write a few sentences about how to check if a piecewise function is continuous.

(5) What does the Intermediate Value Theorem say? What are the conditions that need to be met in order to reach the conclusion of IMT? Draw a picture of a function that does not satisfy the conclusion of the IMT because it is not continuous.

Extra Practice in Book: 2.4:1, 3, 7, 19, 23, 43, 46, 50, 52