Section 5.3: The Fundamental Theorem of Calculus

(1) In this section, we learn the fundamental theorem of calculus. What does the first fundamental theorem of calculus say?

(2) In the first fundamental theorem of calculus, we deal with a function of the form $g(x) = \int_a^x f(t)\,dt$. What happens when you plug in different values of x into this function. What happens when we find $\dfrac{\Delta g}{\Delta x}$? Explain in terms of FTC 1.

(3) In what scenarios do we use FTC1? How does the chain rule come in to play?

(4) The much more commonly used Fundamental Theorem of Calculus is FTC 2. It tells us how to use antiderivatives to calculate exact areas under curve. Write down the statement of FTC 2 and then explain in your own words. Explain exactly what steps you need to do to find the area under a curve.

(5) Use our understanding of getting displacement from velocity in various ways to explain why FTC 2 makes sense.

(6) Explain how you can use FTC 2 to explain FTC 1. (In fact, to prove FTC 2 the standard method uses FTC 1, which is why they are ordered the way they are.)

Extra Practice in Book: 5.3: 3, 5, 9, 13, 21,23, 27, 35, 37, 47, 55, 60, 64, 66