Homework 17

§7.1#3, 9, 13, 17, 23, 29, 37, 59, 61, 77, 128(a and b)

§3.10#18, 34, 35, 36, 37, Extra

§7.1 #3. $\int e^{3x}dx =$

§7.1 #9. $\int \sin(3-t)dt =$

§7.1 #13. $\int x^2(1+2x^3)^2dx =$

§7.1 #17. $\int y^2(1+y)^2dy =$

§7.1 #23. $\int \sin(\theta)(\cos(\theta)+5)^7 d\theta =$

§7.1 #29. $\int \frac{(\ln(z))^2}{z} dz =$

§7.1 #37. $\int \frac{1+e^x}{\sqrt{x+e^x}} dx =$

§7.1 #59. $\int_0^{\pi/2} e^{-\cos(\theta)} \sin(\theta) d\theta =$

§7.1 #61. $\int_1^4 \frac{e^{\sqrt{x}}}{\sqrt{x}} dx =$

§7.1 #77. $\int \frac{t}{\sqrt{t+1}} dt =$

§7.1 #128a,b. Find $\int 4x(x^2+1)dx$ using two methods:

a) Do the multiplication first, then antidifferentiate

b) Use the substitution $u = x^2 + 1$

§3.10 #18. Dominic drove from Phoenix to Tucson on Interstate 10, a distance of 116 miles. The speed limit on this highway varies between 55 and 75 mph. He started his trip at 11:44 pm and arrived in Tucson at 1:12 am. Prove that Dominic was speeding at some point during his trip.

§3.10 #34. Give an example of an interval where the Mean Value Theorem does not apply when $f(x) = \frac{1}{x}$

§3.10 #35. Give an example of a continuous function f that does not satisfy the conclusion of the Mean Value Theorem on the interval $[-1, 1]$

§3.10 #36. Give an example of a function f that is differentiable on the interval $(0, 2)$, but does not satisfy the conclusion of the Mean Value Theorem on the interval $[0, 2]$

§3.10 #37. Give an example of a function that is differentiable on $(0, 1)$ and not continuous on $[0, 1]$, but which satisfies the conclusion of the Mean Value Theorem.

Extra. Let $M(x) = \tan(x)$.

a) On which of the two intervals does $M(x)$ satisfy the conditions of the mean value theorem: $[\pi, 2\pi]$ or $[-\pi/4, \pi/4]$? Explain your reasoning.

b) On this interval, applying the mean value theorem leads us to a point c. What is $M'(c)$?