Math 2423 homework

17. (9/14) As many as needed from 5.3 # 5-36. Hand in 5.3 # 9, 12, 13, 15, 47, 60, 66

18. (9/19) As many as needed from 5.4 # 1-16 and 19-42. Hand in 5.4 # 4, 13-16, 33-38, 41, 42, 45, 46.

19. (9/19) As many as needed from 5.5 # 1-34. Hand in 5.5 # 6, 12, 14-16, 23-27, 28 (when $u = 1 - x$, $x^2 = (1 - u)^2$), 29, 30 ($u = x^2 + 1$)

20. (9/28) 5.4 #47-52, 60 (explain using differentials and using Riemann sums). 6.1 # 6, 14, 15, 31, 49.

21. (9/28) Verify the following properties of $\ln(x)$ in two ways, first by (i) caculating that the two functions have equal derivatives, hence differ by a constant, and finding the constant, and then by (ii) using the definition of $\ln(x)$.

    (a) $\ln(1/x) = -\ln(x)$.

    (b) $\ln(x^n) = n \ln(x)$ (for (ii), substitute $u = t^{1/n}$).

    (c) $\ln(ax) = \ln(a) + \ln(x)$ (for (ii), start by writing $\ln(ax) = \int_1^{ax} \frac{1}{t} \, dt = \int_1^a \frac{1}{t} \, dt + \int_a^{ax} \frac{1}{t} \, dt$, then substitute $u = t/a$ into the second integral).

22. (10/5) As many as needed from 6.2 # 1-18, 31-36. Hand in 6.2 # 2, 6, 13, 32, 36, 41-44, 50, 52, 57.

23. (10/5) As many as needed from 6.3 # 3-26. Hand in 6.3 # 5, 20, 25, 29-32, 46

24. (10/5) 2.5 # 44 (give an explanation, not just the graphs), 6.5 # 6, 9, 10, 14

25. (10/12) 4.1 # 13 (the purpose of the problem is to help one understand exactly what the Extreme Value Theorem says— try to use it that way), 7.1 # 18 (show using the Mean Value Theorem that there is only one number that can be $f^{-1}(1)$), 19 (notice that $x + \sqrt{x} - 6$ is quadratic in $\sqrt{x}$, verify that there is exactly one x that satisfies this)

26. (10/12) 7.1 # 13, 14, 24, 27.