DAILY 1
APPLIED CALCULUS
DUE 2012-08-22

Show your work!
All problems are from "Preparation for Applied Calculus, and Applied Calculus extras". Make sure you do all 12 problems.

#18 (p. 21) Simplify $\dfrac{(m+1)^2/(m^2+3m+2)}{(m^2-m-2)/(m^2+5m+6)}$ to factored form.

#11 (p. 50) For the equation $x = \dfrac{8}{x} + \dfrac{x}{2}$, (a) write the value(s) of x where the denominators equal 0, and (b) keeping these restrictions in mind, find the solution(s). Check your answer(s) by plugging into the original equation.

§3.2 (p. 87) Graph each of the following piecewise-defined functions. Be careful to distinguish omitted values (with an open circle) from included endpoints (with a closed circle).

#8. $f(x) = \begin{cases} 2 - x^2 & \text{if } x \le -1 \\ 3 + 3x & \text{if } x > -1. \end{cases}$

#9. $f(x) = \begin{cases} -2 & \text{if } x < 4 \\ -2 - x & \text{if } 4 \le x \le 12 \\ 10 & \text{if } x > 12. \end{cases}$

§3.3 (pp. 94–95)

#13. In 2004, the price of a car was \$36,000. In 2009, its trade-in value was \$7,200. Write a linear function that models the price depreciation p of the car at time t years after 2004.

#14. A company has observed that, when \$5,000 is spent advertising a new item, 900 units of it are sold monthly; but, when \$50,000 is spent, 990 units are sold monthly. Write a linear function that models the number N of units sold monthly in terms of the amount x spent on advertising, in thousands of dollars.

§§3.4, 3.6, 3.7 (p. 118)

#8. (a) Describe the end behaviour, (b) find the x-intercept(s), and (c) complete a sign diagram for the polynomial function $f(x) = 6x^2 - x^3$.

#12. (a) Describe the end behaviour, (b) determine any holes, (c) determine any vertical asymptotes, (d) find the x-intercept(s), and (e) complete a sign diagram for the rational function $f(x) = \dfrac{-x^2 + 6x - 5}{(x-3)^2}$.

§4.3 (p. 124) For #15, 20, use the properties of logarithms to expand the expression as a sum, difference, and/or multiple of a logarithm.

#15. $\ln\left(\dfrac{e^x}{e^x + 1}\right)$.

#20. $\ln x^{\ln x}$.

§4.4 (p. 130) Solve the following equations algebraically. Give approximate decimal equivalents, rounded to three decimal places.

#31. $\log_3(x+1) + \log_3(2x) = \log_3(3x+1)$.

#32. $3 + \log(2x+5) = 2$.