Assignment 9 (SOLUTION from Textbook Manual Solution)

Text: *Calculus for the Life Sciences, S. Schreiber, K. Smith and W. Getz, Wiley, 2014*

Section 5.1

6. We obtain $F(x) = -2x^{-3}/3 + C$, because $F'(x) = 2x^{-4}$ by the power rule.

9. We get $F(t) = 2t^4 + 15t^2/2 + C$, because $F'(t) = 8t^3 + 15t$ by the power rule.

16. We obtain $F(x) = 14e^x + C$, because $F'(x) = 14e^x$.

19. We get $F(x) = (2/5)x^{5/2} + (2/3)x^{3/2} + \ln x + C$, because $F'(x) = x^{3/2} + x^{12} + x^{-1}$ by the power rule.

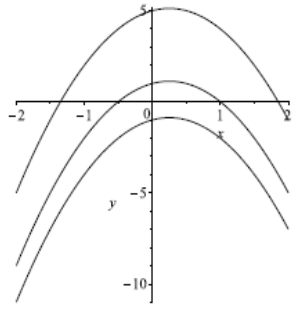
20. We get $F(u) = (1/4)u^4 - u^2 + (2/3)u^{3/2} + C$, because $F'(u) = u^3 - 2u + u^{1/2}$ by the power rule.

21. We get $F(u) = 3u^2 + 3\sin u + C$, because $F'(u) = 6u + 3\cos u$.

22. We get $F(x) = (5/2)x^2 + 4\cos x + C$, because $F'(x) = 5x - 4\sin x$.

29. a. $F(x) = x - 2x^2 + C$, because $F'(x) = 1 - 4x$. Also, $0 = F(1) = 1 - 2 + C$, thus $F(x) = x - 2x^2 + 1$.

b.



c. The maximum of $F(x) + C$ is where $F'(x) = 1 - 4x = 0$, i.e. at $x = 1/4$ ($F''(x) = -4 < 0$, so it is a maximum). The value of the maximum is $(1/4) - 2(1/4)^2 + 1 + C$, thus we need that $C = 2(1/4)^2 - 1/4 - 1 = -9/8$.

49. The population $P(t)$ is the antiderivative of $4 + 5t^{2/3}$; thus $P(t) = 4t + 3t^{5/3} + C$. We know that $2000 = P(0) = C$, thus $P(8) = 2000 + 4 \cdot 8 + 3 \cdot 8^{5/3} = 2128$ people.