

Assignment 5 (SOLUTION from Textbook Manual Solution)

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

Section 3.1

6. Using the sum and power rules, $f'(x) = 15x^2 - 10x + 3$.

9. Using the sum, power and exponential rules, $s'(t) = 4e^t - 5$.

33. a. $10 = N(0) = 50(1 - C)$, so $C = 4/5$.

b. $N'(t) = -50(-0.1)(4/5)e^{-0.1t} = 4e^{-t/10}$ and then $N'(5) \approx 2.43$ individuals per day.

Section 3.2

2. Using the product rule, we get $p'(x) = 2x(1 - 3x^3) + (x^2 + 4)(-9x^2) = -15x^4 - 36x^2 + 2x$.

3. Using the quotient rule, we obtain that $q'(x) = \frac{4(3 - x^2) - (-2x)(4x - 7)}{(3 - x^2)^2} = \frac{4x^2 - 14x + 12}{(3 - x^2)^2}$.

23. We obtain that $F'(x) = (6x(2x^2 + x - 3) - (3x^2 + 5)(4x + 1))/(2x^2 + x - 3)^2$, so $F'(-1) = 9$ and then the tangent line is given by $y - F(-1) = F'(-1)(x - (-1))$, i.e. $y - (-4) = 9(x + 1)$, which is $y = 9x + 5$.

Section 3.3

8. a. $dg/du = 7u^6$.

b. $du/dx = -8 - 24x$.

c. $df/dx = 7(5 - 8x - 12x^2)^6(-8 - 24x)$.

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10. Using the chain rule, $dy/dx = 2xe^{2+x^2}$.

15. Using the chain rule, $dy/dx = 2/(2x+5)$.

43. Clearly, $h'(t) = 0.19$ inches per month.
Also, $dW/dt = (2.6)0.0024h^{1.6}0.19 = 0.72$
pounds per month (where $h = 32+0.19 \cdot 120$).