Solutions to Some Problems, *Calculus* (Third Ed.)

Chapter 5

Section 5.1

2. (b) $\frac{3}{2}x^2 + C$. (d) $6x^{1/2} + C$. (f) $x^4 + \frac{5}{3}x^3 - \frac{7}{2}x^2 - 2x + C$. (h) $-x^{-1} + 3\ln|x| + 2x + C$.

3. (b) $\frac{1}{\ln 3}3^x + C$. (d) $-\frac{1}{\ln 3}3^{-x} + C$. (f) $\frac{1}{\pi+1}x^{\pi+1} + \frac{1}{\ln \pi}\pi^x - \frac{1}{\ln \pi}\pi^{-x} + C$. (h) $3\sin x + 4\sinh x + C$.

5. (b) $\frac{1}{a}\cosh ax$. (d) $-\frac{1}{a}\cot ax$. (f) $-\frac{1}{a}\csc ax$. (h) $\frac{1}{a}\ln|ax + b|$.

7. i) G; ii) g'; iii) g; iv) γ.

8. (b) $s = t^2$. (d) $s = \frac{3}{\pi}\sin \pi t + 4$. (f) $s = \frac{1}{2}gt^2 + 48t + 248$.

9. (b) $v = t - \frac{1}{2}t^2 - 24; s = \frac{1}{2}t^2 - \frac{1}{6}t^3 - 24t + 55$. (d) $v = \frac{5}{2}\cos 2t; s = \frac{5}{4}\sin 2t$. (f) $v = gt; s = \frac{1}{2}gt^2 + 4g$.

10. 144 ft.

14. 150 mph

16. $\sqrt{2gh}$.

18. 240 feet

26. (a) $g(0) = g(0+0) = g(0) + g(0) - 0 \Rightarrow g(0) = 0$. (b) $g'(x) = 5 - 3x$. (c) $g(x) = 5x - \frac{3}{2}x^2$.

Section 5.2

2. (b) $y = (\frac{8}{3})^{1/4}x^{3/8}$. (d) $y^2 = 2x^3 + 6x - 6$. (f) $y = \tan^{-1}(1 + \frac{1}{2}x^2)$. (h) $y = (8 + 3x - \frac{3}{4}x^4)^{1/3}$.

3. in 1983.

4. 1000 bacteria.

6. 90 sec.

8. $10\sqrt[3]{4}$ feet.

10. $2048\sqrt{2}$ mm.

12. 60 mph.

14. $h = (2 - \frac{1}{36}t)^2$ feet; 72 sec.

Section 5.3

4. about 14.31 inches of mercury.

6. about 19.9 weeks.

9. $t = -\frac{1}{k}\ln(\frac{c_0}{c_L}); (1 - \frac{c_0}{c_L})D.$

10. about \$26.11.

14. $\dfrac{dP}{dt} = kP(1-P), P = \dfrac{P_0}{P_0 + (1-P_0)e^{-kt}}.$

16. about 11:40 am.

18. (a) $k = \frac{\ln 2}{20}$. (b) $\frac{dQ}{dt} = U - kQ$. (c) $Q = \frac{1}{k}U + Ae^{-kt}$, A a constant. (d) As $t \to \infty, Q \to \frac{1}{k}U$. (e) The system level is $\frac{20}{\ln 2}U \approx 28.85U$ units of urokinase.

21. Mimic problem 20.