

M120 Solutions for Even Review Problems

Chapter 4

16.  $6e^{3x+5}$

18.  $\frac{x+2}{x^2+4x+1}$

20.  $\frac{\ln 2x-1}{(\ln 2x)^2}$

22.  $\frac{6e^{3x}}{(e^{3x}+2)^2}$

24.  $\frac{-4}{5e^x(1+e^{-x})^{1/5}}$

Chapter 5

2.  $\frac{3}{5}\sqrt[3]{x^5} - \ln|x| + 5x + \frac{2}{3}\sqrt{x^3} + C$

4.  $\frac{3}{2}\sqrt[3]{s^4} + 5\ln s + C$

6.  $-e^{-3x} + 2e^x + C$

8.  $\frac{1}{2}x^4 + \frac{2}{3}x^3 + \frac{2}{5}\sqrt{x^5} + \frac{3}{2}\sqrt{x^3} + C$

10.  $\frac{\sqrt{(3x^2+2x+5)^3}}{3} + C$

12.  $\frac{1}{2}\ln|x^2+4x+2| + C$

14.  $\frac{(x-5)^{13}}{13} + C$

16.  $\frac{(\ln 3x)^2}{2} + C$

20.  $\left|2(5x-2)^3\right|_{-1}^3 = 1,710$

22.  $\left|\frac{2\sqrt{t^3}}{3} - \frac{2}{\sqrt{t}}\right|_1^4 = \frac{17}{3}$

24.  $\left|\frac{x^2}{2} + 2\sqrt{x} - 5\ln|x|\right|_1^9 = 44 - 5\ln 9$

26.  $\left|-\frac{3}{2(x^2+4x+5)}\right|_{-1}^1 = \frac{3}{5}$

28.  $\left|\frac{2}{3}\sqrt{(e^{-x}+1)^3}\right|_0^1 \sim 2.457$

30.  $\left|-\frac{1}{\ln x}\right|_e^{e^2} = \frac{1}{2}$

32.  $\left|e^x - e^{-x}\right|_{-1}^1 = 2(e - e^{-1})$

\*36.  $\frac{32\sqrt{2}}{3} - \frac{16}{3} - 8\ln 2$

38.  $\int_0^2 [(6-x) - 2x] dx = 6$

40. 0.8036

42. 0.3817

56.  $V = \pi \int_0^{10} (e^{-x/10})^2 dx = \pi \int_0^{10} (e^{-x/5}) dx \sim 13.582$

58.  $V = \pi \int_1^4 \left(\frac{x+2}{\sqrt{x}}\right)^2 dx \sim 14.886$

60.  $y = \frac{x^3}{3} - \frac{x^2}{2} + \frac{7}{6}$

62.  $y = t + \ln|t| + 2$

64.  $f(x) = -\frac{1}{4}e^{-2x^2} - \frac{11}{4}$

68. \$774

78.  $\frac{2}{3}$  meter

88. 80.604 or 80,604 people

### Chapter 6

6.  $x(\ln x)^2 - 2x \ln x + 2x + C$  (uses parts twice!!)

10.  $F(x) = -\frac{1}{3}(x+2)e^{-3x} - \frac{1}{9}e^{-3x}$  evaluated  $= \frac{7}{9} - \frac{10}{9}e^{-3}$

12. Uses table:  $u = 3t$  so  $du = 3dt$ ;  $\frac{2}{3} \ln |3t + \sqrt{9t^2 + 16}| + C$

14. Uses table:  $\frac{4}{9} \ln \left| \frac{x}{9+5x} \right| + C$

16. Uses table:  $-\frac{1}{2} \ln \left| \frac{2 + \sqrt{4-x^2}}{x} \right| + C$

### Chapter 7

8.  $f_x = xy^2e^{xy} + ye^{xy}$ ;  $f_y = x^2ye^{xy} + xe^{xy}$

12.  $f_x = 2x - 2y^2$ ;  $f_y = 3y^2 - 4xy$ ;  $f_{xx} = 2$ ;  $f_{yy} = 6y - 4x$ ;  $f_{xy} = f_{yx} = -4y$

38.  $(2x^2 - 6x)_0^1 = -4$

40.  $\left[ -\frac{4}{3}(1-y)^{3/2} \right]_0^1 = \frac{4}{3}$

### Chapter 9

2. Converges – Geometric -  $|r| = \left| \frac{4}{9} \right| \leq 1$

4. Diverges – Geometric -  $|r| = \left| -\frac{3}{2} \right| > 1$

6. Converges – Geometric -  $|r| = \left| \frac{2}{3} \right| \leq 1$

8. Converges – Geometric -  $|r| = \left| \frac{2}{3} \right| \leq 1$

10. Diverges – divergence test  $\lim_{n \rightarrow \infty} a_n = \lim_{n \rightarrow \infty} \left( 1 + \frac{1}{n} \right)^2 = 1^2 = 1 \neq 0$

12. Converges – p Series

14. Converges – ratio test

16. Diverges – ratio test

22.  $\sum_{n=0}^{\infty} (-2)^{n-1} x^n$

### Appendix

60.  $\frac{12}{29}$

62. 0

64.  $e^{-6} \sim .00247$