Math 1220 Final Exam Extra Review Questions
Answer Key

(1) 1

(2) (a) $\frac{-2}{1+\sqrt{x}} + C$ (b) -2

(3) $\frac{3\pi}{2}$

(4) $y = 2 + \frac{2}{e^{4t}}$

(5) $\frac{4}{4+\pi}$

(6) (a) 2 (b) $\sin x - x\cos x + C$

(7) 8π

(8) (a) $1 + x^4 + \frac{1}{2}x^8 + \frac{1}{6}x^{12} + \frac{1}{24}x^{16} + \cdots$

(b) ~ 0.50636007

(9) (a) $\frac{1}{3}\ln|x^3+1| + C$ (b) $-\frac{1}{2}xe^{-2x} - \frac{1}{4}e^{-2x} + C$

(c) 2 (d) $\frac{1}{3}e^{x^3} + C$ (e) $\ln\left|\frac{x-1}{x}\right| - \arctan x + C$

(10) ~ 135 yrs

(11) $x \in \mathbb{R}$

(12) converge

(13) $\sum_{n=0}^{\infty} \frac{x^{3n+2}}{n!(3n+2)}$

(14) (a) $y' = \frac{\cos(\sqrt{x})\left(\frac{3}{3x+1}\right) + \frac{\ln(3x+1)\sin(\sqrt{x})}{2\sqrt{x}}}{\cos^2(\sqrt{x})}$

(b) $y' = (x^2+x)^{1+x}\left(2 + \frac{1}{x} + \ln(x^2+x)\right)$

(15) $y = \frac{1}{7}x^3 + \frac{1}{x^4}$

(16) (a) $\frac{-(4x^2+9)^{3/2}}{27x^3} + C$

(b) $2\sqrt{2}$

(c) $-2/9$

(d) $3\ln|x| - \frac{3}{2}\ln(x^2+1) + 2\arctan x + C$

(16) (e) $\sin x - \frac{1}{3}\sin^3 x + C$

(f) diverges

(g) $4(\sqrt{7} - \sqrt{6})$

(17) $5/4$

(18) (a) $a_1 = \frac{5}{\sqrt{2}}$, $a_2 = \frac{10}{\sqrt{17}}$, $a_3 = \frac{15}{\sqrt{42}}$

(b) converges to $\sqrt{5}$

(19) (a) converges absolutely

(b) diverges

(c) converges absolutely

(20) $2 - x + \frac{17}{2}x^2 + \frac{7}{2}x^3 + \frac{155}{8}x^4 + \cdots$

(21) (a) $\frac{1}{5} - \frac{1}{25}(x-2) + \frac{1}{125}(x-2)^2 - \frac{1}{625}(x-2)^3 + \cdots$

(b) 0.1886768

(c) $|R_4(2.3)| \leq 0.000002592$

(22) $(6, 5\pi/6)$, $(-6, \pi/6)$ $(6, -7\pi/6)$

(23) $\frac{-2-3\sqrt{2}}{2}$

(24) (a) $r = 4\sin\theta$

(b) 4π