Math 1297, Calculus II

Lecture Section 8 (Discussion sections 12-15)

Test 2 Practice Problems answers

1. a) 1/2 b) e^{-1}
2. 10. Each integration by parts decreases the power of x in the integrand by one. After 10 integrations by parts, the remaining integral can be evaluated directly.
3. $\frac{3}{2}x\sin(2x) + \frac{3}{4}\cos(2x) + C$
4. 1/4. (Let $u = \cos(x)$ or $u = \sin(x)$.
5. $-\frac{\cos(3x)}{6} - \frac{\cos(7x)}{14} + C$
6. $\int 8\tan^3(\theta)\sec(\theta)d\theta$
7. a)$\frac{A}{x} + \frac{Bx+C}{x^2+9}$ b)$\frac{A}{x} + \frac{B}{x^2} + \frac{C}{x^3} + \frac{D}{x-2}$
8. $2\ln|x| - \ln|x+1| + \frac{1}{2}\ln|x - \frac{1}{2}| + C$
9. $2x - \ln|x + \frac{2}{3}| + C$
10. $\int \frac{2u^2}{u^2-4}du$. Easier since no square root: divide out and use partial fractions.
11. $\frac{\sqrt{4x^2-3}}{3x} + C$
12. $L_3 < M_3 < T_3 < R_3$
13. 2 (From section 8.8 which is not requred, but the idea is exactly the same as the convergence of series)
14. $\int_1^2 \sqrt{1 + \frac{1}{x^4}}dx = \int_{\frac{1}{2}}^{1} \sqrt{1 + \frac{1}{y^4}}dy$
15. $\int_0^9 2\pi\sqrt{y}\sqrt{a + \frac{1}{4y}}dy$
16. True. $\{a_n\}$ must not only converge, but must converge to zero.
17. Lots of correct answers. For example: 1,-1,1,-1,... or $a_n = \frac{(-1)^n}{n}$
18. 0. Lots of correct explanations. For example, the degree of the denominator is larger than the degree of the numerator, so the denominator grows faster than the numerator. Or, divide all terms in numerator and denominator by n^2; then the numerator goes to zero and the denominator goes to one.
19. (a) converges to 8 (geometric with $r = \frac{2}{3}$) (b) converges to -2/3 (geometric with $r = \frac{-1}{2}$ (c) diverges since the terms being added up don't converge to zero (they go to 1/2)
20. See book or class notes.