

ANSWERS TO MIDTERM EXAMS

1 First Midterm

1. $\frac{1}{2} \tan^{-1}(x^2) + C$
2. $\frac{x^2}{2} \left((\ln x)^2 - \ln x + 1/2 \right) + C$
3. $\frac{1}{11} \sin^{11} \theta - \frac{1}{13} \sin^{13} \theta + C$
4. $\ln |x - 1| - \ln |x| + 1/x + C$
5. $\frac{\sqrt{x^2-9}}{9x} + C$
6. The integral diverges to $+\infty$.

2 Second Midterm

1.
$$\lim_{k \rightarrow \infty} \sum_{n=1}^k a_n = L.$$
2. $[-1/3, 1/3]$
3. (a) The series diverges by the integral test.
(b) The series converges by comparison with $\sum \frac{1}{n^2}$.
4. The series converges to -8 .
5. (a) The series converges by the alternating series test.
(b) The series is not absolutely convergent. Use the limit convergence test to see this.
6. $\frac{1}{3}x^3 - \frac{1}{2}x^2 + x$

7.
$$\sum_{n=0}^{\infty} \frac{(-1)^n x^{2n+1}}{n!}$$