Math 2320 - Test 3 Review

1 Integration

1. $\int \frac{1}{x\ln(x)}dx$ u-sub
2. $\int \frac{1}{x(\ln(x))^2}dx$ u-sub
3. $\int \tan(x)dx$
4. $\int \sec(x)dx$
5. $\int \frac{1}{\sqrt{x^2-4}}\,dx$ hint: trig sub
6. $\int \frac{2x+2}{x^2+2x}\,dx$
7. $\int \frac{2x^2+x+1}{x^3+x}\,dx$
8. $\int \frac{2x^2+3x+1}{x(x+1)^2}\,dx$
9. $\int_1^\infty \frac{1}{x^2}\,dx$
10. $\int_1^\infty \frac{1}{x}\,dx$
11. $\int_1^\infty \frac{1}{\sqrt{x}}\,dx$

2 Limits

12. $\lim_{n\to\infty}(1+\frac{1}{n})^n$
13. $\lim_{x\to 0^+}(x)^x$

14. $\lim_{x \to 0^+} (1+x)^{\frac{1}{x}}$

15. $\lim_{x \to 0^+} (1+5x)^{\frac{1}{2x}}$

3 Series

16. $\sum_{n=1}^{\infty} \frac{1}{n} - \frac{1}{n+1}$

17. $\sum_{n=1}^{\infty} \ln\left(\frac{n+1}{n}\right)$

18. $\sum_{n=1}^{\infty} \frac{2^n}{3^n}$

19. $\sum_{n=1}^{\infty} \frac{3^n}{2^n}$

20. $\sum_{n=7}^{\infty} e^{-n}$

21. $\sum_{n=7}^{\infty} \frac{1}{n \ln(n)}$

22. $\sum_{n=1}^{\infty} \left(1 - \frac{1}{n}\right)^n$

23. $\sum_{n=1}^{\infty} \frac{n^2+1}{3n^2+1}$

24. $\sum_{n=1}^{\infty} \frac{1}{n}$

25. $\sum_{n=1}^{\infty} \frac{1}{n^2}$

26. $\sum_{n=1}^{\infty} \frac{1}{\sqrt{n}}$

27. $\displaystyle\sum_{n=1}^{\infty} \frac{n^2+1}{n^3+1}$

28. $\displaystyle\sum_{n=1}^{\infty} \frac{n^2+1}{n^4+1}$

29. $\displaystyle\sum_{n=1}^{\infty} \frac{\sqrt{n+5}}{n^2+1}$

30. $\displaystyle\sum_{n=1}^{\infty} \frac{2^n+n^2}{3^n+n^3}$

31. $\displaystyle\sum_{n=1}^{\infty} (-1)^n \frac{1}{n}$

32. $\displaystyle\sum_{n=1}^{\infty} (-1)^n \frac{1}{n^2}$

33. $\displaystyle\sum_{n=1}^{\infty} (-1)^n \frac{1}{\sqrt{n}}$

34. $\displaystyle\sum_{n=1}^{\infty} \frac{n}{n!}$

35. $\displaystyle\sum_{n=1}^{\infty} \frac{e^n}{n!}$

36. $\displaystyle\sum_{n=1}^{\infty} \frac{n^2}{e^n}$

37. $\displaystyle\sum_{n=1}^{\infty} \frac{e^n}{n^2}$

38. $\displaystyle\sum_{n=1}^{\infty} \frac{n^n}{n!}$

39. $\displaystyle\sum_{n=1}^{\infty} \frac{n!}{n^n}$

40. $\displaystyle\sum_{n=1}^{\infty}\left(\frac{n^2+1}{3n^2+1}\right)^n$

41. $\displaystyle\sum_{n=1}^{\infty}\left(\frac{3n^2+1}{2n^2+1}\right)^n$

42. $\displaystyle\sum_{n=1}^{\infty}\left(\frac{2n^2}{3n^2+1}\right)^n$

43. $\displaystyle\sum_{n=1}^{\infty}\left(1-\frac{1}{n}\right)^{n^2}$