

SAMPLE PROBLEMS

Determine whether each of the following series converges or diverges.

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|--|---|---|
| 1. $\sum \frac{1}{n}$ | 2. $\sum \frac{1}{\sqrt{n}}$ | 3. $\sum \frac{1}{n!}$ |
| 4. $\sum e^{-n}$ | 5. $\sum \frac{\sin^2 n}{n^2}$ | 6. $\sum \frac{\sin n}{n^2}$ |
| 7. $\sum e^{(-1/n)}$ | 8. $\sum \frac{\cos n + 5}{n^2}$ | 9. $\sum \frac{\cos n + 5}{\sqrt{n}}$ |
| 10. $\sum \frac{2^{2n+3}}{5^{n-4}}$ | 11. $\sum \frac{\ln n}{n}$ | 12. $\sum \frac{1}{n \ln n}$ |
| 13. $\sum \frac{2^{2n+3}}{3^{n-4}}$ | 14. $\sum \frac{1}{n^2 \ln n}$ | 15. $\sum \frac{1}{\sqrt{n} \ln n}$ |
| 16. $\sum \frac{1}{n(\ln n)^2}$ | 17. $\sum \frac{1}{\sqrt{n}(\ln n)^2}$ | 18. $\sum \frac{1}{n\sqrt{\ln n}}$ |
| 19. $\sum \frac{\ln n}{n^3}$ | 20. $\sum \frac{\ln n}{n^2}$ | 21. $\sum \frac{1}{n^2+1}$ |
| 22. $\sum \frac{1}{n^2-1}$ | 23. $\sum \frac{n+1}{n^2+1}$ | 24. $\sum \frac{n-2}{n^2-1}$ |
| 25. $\sum \frac{2^n}{n^2}$ | 26. $\sum \frac{n^2}{2^n}$ | 27. $\sum \left(1 - \frac{2}{n}\right)^n$ |
| 28. $\sum \left(1 + \frac{2}{n}\right)^n$ | 29. $\sum \left(1 - \frac{2}{n}\right)^{(n^2)}$ | 30. $\sum \left(1 + \frac{2}{n}\right)^{(n^2)}$ |
| 31. $\sum \left(1 - \frac{2}{n}\right)^{(n^3)}$ | 32. $\sum \left(1 + \frac{2}{n}\right)^{(n^3)}$ | 33. $\sum \frac{n!}{n^n}$ |
| 34. $\sum \frac{n!}{(2n)!}$ | 35. $\sum \frac{10^{2n+5}n!}{(2n)!}$ | 36. $\sum \frac{(n!)^n}{n^{(n^2)}}$ |
| 37. $\sum \frac{(2n+1)!}{3^n(n!)^2}$ | 38. $\sum \frac{(2n+1)!}{3^{2n+1}(n!)^2}$ | 39. $\sum \frac{5^n(n!)^3}{(3n)!}$ |
| 40. $\sum \frac{(\ln n)^n}{n^n}$ | 41. $\sum \frac{1}{n(n+1)}$ | 42. $\sum \frac{2^n}{n!}$ |
| 43. $\sum \frac{1}{n \cdot \ln n \cdot \sqrt{\ln(\ln n)}}$ | 44. $\sum \frac{1}{n \cdot \ln n \cdot \ln(\ln n)}$ | 45. $\sum \frac{5}{1+e^n}$ |
| 46. $\sum \frac{1-n}{n \cdot 2^n}$ | 47. $\sum^n \sqrt{n}$ | 48. $\sum n \sin\left(\frac{1}{n}\right)$ |
| 49. $\sum \sin\left(\frac{1}{n}\right)$ | 50. $\sum \cos\left(\frac{1}{n}\right)$ | 51. $\sum n \cos\left(\frac{1}{n}\right)$ |
| 52. $\sum \sin\left(\frac{1}{n^2}\right)$ | 53. $\sum n^2 \sin\left(\frac{1}{n^2}\right)$ | 54. $\sum \tan\left(\frac{1}{n \ln n}\right)$ |
| 55. $\sum \ln\left(\frac{n}{n+1}\right)$ | 56. $\sum \frac{\ln n}{\ln(2n+1)}$ | 57. $\sum (\ln n - \ln(2n+1))$ |
| 58. $\sum (e^{(1/n^2)} - 1)$ | 59. $\sum (\cos\left(\frac{1}{n}\right) - 1)$ | 60. $\sum \ln\left(1 + \frac{1}{n^2}\right)$ |