تمرین ۱

در مورد همگرایی یا واگرایی دنباله‌های
ذیل بحث کنید.

22. $a_n = \dfrac{n^3 - 1}{n - 2}, n \ge 3$

23. $a_1 = 1, a_n = \dfrac{a_{n-1}}{2}$, if $n \ge 2$

24. $a_1 = 1, a_n = \dfrac{2}{a_{n-1}}$, if $n \ge 2$

25. $a_n = (-1)^n \dfrac{n^2 + 3}{\sqrt[4]{n^9 + 3n^3 + 4}}$

1. $a_n = \dfrac{2}{n+1}$

2. $a_n = \dfrac{n}{n^2 + 3}$

26. $a_n = \dfrac{n^3 + 3}{\sqrt[4]{n^9 + 3n^3 + 4}}$ **27.** $a_n = \dfrac{1}{n} - \dfrac{1}{n+1}$

3. $a_n = (-1)^n \dfrac{1}{n}$

4. $a_n = (-1)^n n, n \ge 0$

28. $a_n = \dfrac{1}{n+1} - \dfrac{1}{n+2}$ **29.** $a_n = \sqrt{n^2 + 1} - n$

5. $a_n = \dfrac{n}{n+4}, n \ge 0$

6. $a_n = (-1)^n \dfrac{n}{n+4}, n \ge 0$

30. $a_n = \sqrt{n+1} - \sqrt{n}$ **31.** $a_n = \dfrac{1}{\sqrt{n^2 + 1} - n}$

7. $a_n = \dfrac{n^2 + 2n + 3}{n^2 - 4n + 3}, n \ge 4$ **8.** $a_n = \dfrac{n^2}{n^2 - 4}, n \ge 3$

32. $a_n = \dfrac{1}{\sqrt{n^2 + n} - n}$ **33.** $a_n = \dfrac{1}{n} \sin \dfrac{\pi}{n}$

9. $a_n = \dfrac{n^3 + 2n^2 - 1}{n^2 + n}$ **10.** $a_n = \dfrac{n^3 + 2n^2 - 1}{n^4 + n}$

34. $a_n = n \sin \dfrac{\pi}{n}$ **35.** $a_n = \dfrac{1}{n} \cos n\pi$

11. $a_n = \dfrac{\pi}{n}$

12. $a_n = \ln n$

36. $a_n = n \cos n\pi$ **37.** $a_n = \dfrac{n}{n^2 + 1} \cos n\pi$

13. $a_n = \dfrac{e^n}{n}$

14. $a_n = \dfrac{n}{e^n}$

38. $a_n = \dfrac{n}{n^2 + 1} \sin \dfrac{n\pi}{2}$ **39.** $a_n = \dfrac{e^n}{1 + e^n}, n \ge 0$

15. $a_n = \dfrac{e^n}{n^p}, p > 0$

16. $a_n = \dfrac{\sin n}{e^n}$

40. $a_n = \dfrac{2^n}{1 + 2^n}, n \ge 0$ **41.** $a_n = \left(1 + \dfrac{1}{n}\right)^n$

17. $a_n = \dfrac{\ln n}{n^2} - 1$

18. $a_n = \dfrac{\ln n}{e^n}$

42. $a_n = \left(1 + \dfrac{1}{n}\right)^{2n}$

19. $a_n = \sin \dfrac{\pi}{n}$

20. $a_n = \cos \dfrac{\pi}{n}$

43. $a_1 = 1, a_n = \dfrac{a_{n-1}}{n^2}$, if $n \ge 2$

21. $a_n = \dfrac{e^n}{n^2 + 3n - 4}, n \ge 2$

44. $a_1 = 1, a_2 = \dfrac{1}{2}, a_n = \dfrac{a_{n-1} + a_{n-2}}{n}, n \ge 3$