◇「콘텐츠산업 진흥법 시행령」제33조에 의한 표시
1) 제작연월일 : 2019-08-12
2) 제작자 : 교육지대㈜
3) 이 콘텐츠는 「콘텐츠산업 진흥법」에 따라 최초 제작일부터 5년간 보호됩니다.

◇「콘텐츠산업 진흥법」외에도「저작권법」에 의하여 보호되는 콘텐츠의 경우, 그 콘텐츠의 전부 또는 일부를 무단으로 복제하거나 전송하는 것은 콘텐츠산업 진흥법 외에도 저작권법에 의한 법적 책임을 질 수 있습니다.

01 등비급수의 성질

두 등비급수 $\sum_{n=1}^{\infty} p^n$, $\sum_{n=1}^{\infty} q^n$ 이 수렴하면

(1) $\sum_{n=1}^{\infty} cp^n = c\sum_{n=1}^{\infty} p^n$

(2) $\sum_{n=1}^{\infty} (p^n + q^n) = \sum_{n=1}^{\infty} p^n + \sum_{n=1}^{\infty} q^n$

(3) $\sum_{n=1}^{\infty} (p^n - q^n) = \sum_{n=1}^{\infty} p^n - \sum_{n=1}^{\infty} q^n$

◪ 다음 등비급수의 합을 구하여라.

1. $\sum_{n=1}^{\infty} \left(\frac{3}{4}\right)^n$

2. $\sum_{n=1}^{\infty} 5\left(\frac{3}{4}\right)^{n-1}$

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

4. $\sum_{n=1}^{\infty} \frac{2^n + 3^n}{4}$

5. $\sum_{n=1}^{\infty} \left(\frac{1}{2^n} - \frac{1}{3^n}\right)$

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

7. $\sum_{n=1}^{\infty} \left(\frac{2^{n+1}}{3^n} + \frac{4}{2^n}\right)$

8. $\sum_{n=1}^{\infty} \left(\frac{1}{2^n} + \frac{3^n}{4^n}\right)$

9. $\sum_{n=1}^{\infty} \left(\frac{3^n}{4^n} - \frac{3}{2^n}\right)$

10. $\sum_{n=1}^{\infty} \left(\frac{4}{3^n} - \frac{3}{4^n}\right)$

11. $\sum_{n=1}^{\infty} \left(\frac{2^{n+1}}{4^n} + \frac{6}{3^n}\right)$

12. $\sum_{n=1}^{\infty} \left(\frac{5}{4^n} + \frac{4}{5^n}\right)$

13. $\sum_{n=1}^{\infty} \left(\frac{3}{4^n} + \frac{2}{(-5)^{n-2}}\right)$

Copyright (c) since 2000 EDUZONE Co.,Ltd all rights reserved
교육지대(주) 서울특별시 구로구 구로동 디지털로33길 55 이앤씨벤처드림타워2차 805호 대표전화 : 1544-5633 FAX : 02-521-0331
I410-UCI(KEPA)-0199-2019-001-000244110

14. $\sum_{n=1}^{\infty}\left(\frac{3}{5^n}+\frac{2}{3^n}\right)$

15. $\sum_{n=1}^{\infty}\left(\frac{3^n}{5^n}+\frac{2}{(-3)^n}\right)$

16. $\sum_{n=1}^{\infty}\left(\frac{1}{2^{n-1}}+\frac{3}{5^{n-1}}\right)$

17. $\sum_{n=1}^{\infty}\left(\frac{1}{5^{n-1}}+\frac{5}{6^{n-1}}\right)$

18. $\sum_{n=1}^{\infty}\frac{1+(-1)^n}{3^n}$

19. $\sum_{n=1}^{\infty}8\left(\frac{1+2^n}{3^n}\right)$

20. $\sum_{n=1}^{\infty}\frac{1+(-2)^n}{3^n}$

21. $\sum_{n=1}^{\infty}\frac{2^n+(-2)^n}{3^n}$

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

23. $\sum_{n=1}^{\infty}\frac{2^n-1}{4^n}$

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

25. $\sum_{n=1}^{\infty}\frac{3^n+5}{4^n}$

26. $\sum_{n=1}^{\infty}\frac{2^n+3^n}{4^n}$

27. $\sum_{n=1}^{\infty}\frac{3^n-2^n}{4^n}$

28. $\sum_{n=1}^{\infty}\frac{2^{n-1}+3^{n+1}}{4^n}$

29. $\sum_{n=1}^{\infty}\frac{3^{n+1}-3^{n-1}}{4^n}$

30. $\sum_{n=1}^{\infty}\frac{2^{2n}-1}{5^n}$

31. $\sum_{n=1}^{\infty}\frac{1+(-3)^n}{5^n}$

족보닷컴
zocbo.com
Copyright (c) since 2000 EDUZONE Co,.Ltd all rights reserved
교육지대(주) 서울특별시 구로구 구로동 디지털로33길 55 이앤씨벤처드림타워2차 805호 대표전화 : 1544-5633 FAX : 02-521-0331
I410-UCI(KEPA)-0199-2019-001-000244110

32. $\sum_{n=1}^{\infty}\frac{3^n+1}{5^n}$

33. $\sum_{n=1}^{\infty}\frac{3^n-1}{5^n}$

34. $\sum_{n=1}^{\infty}\frac{2^n-3^n}{5^n}$

35. $\sum_{n=1}^{\infty}\frac{4^n+(-2)^n}{5^n}$

36. $\sum_{n=1}^{\infty}\frac{2^n+4^n}{5^n}$

37. $\sum_{n=1}^{\infty}\frac{3^n+4^n}{5^n}$

38. $\sum_{n=1}^{\infty}\frac{2^{n-1}+3^n}{5^n}$

39. $\sum_{n=1}^{\infty}\frac{2\cdot 3^n+(-2)^{2n}}{5^n}$

40. $\sum_{n=1}^{\infty}\frac{1+2^n}{6^n}$

41. $\sum_{n=1}^{\infty}\frac{3^n-2^n}{6^n}$

42. $\sum_{n=1}^{\infty}\frac{3^n+4^n}{6^n}$

43. $\sum_{n=1}^{\infty}\frac{2^{n+1}+4^n}{6^n}$

44. $\sum_{n=1}^{\infty}\frac{2^{n-1}+3^n}{6^n}$

45. $\sum_{n=1}^{\infty}\frac{2^{n+1}+(-3)^n}{6^n}$

46. $\sum_{n=1}^{\infty}\frac{1+5^n}{6^n}$

47. $\sum_{n=1}^{\infty}\frac{5^n+(-1)^{n-1}}{6^n}$

48. $\sum_{n=1}^{\infty}\frac{2^{n-1}+3^{n-1}}{6^{n-1}}$

49. $\sum_{n=1}^{\infty}\frac{2^{n+1}-3^{n-1}}{6^{n+1}}$

족보닷컴 zocbo.com
Copyright (c) since 2000 EDUZONE Co,.Ltd all rights reserved
교육지대(주) 서울특별시 구로구 구로동 디지털로33길 55 이앤씨벤처드림타워2차 805호 대표전화 : 1544-5633 FAX : 02-521-0331

50. $\sum_{n=1}^{\infty}\frac{3^{n+1}+(-5)^{n-1}}{6^n}$

51. $\sum_{n=1}^{\infty}\frac{3^n-2^n}{7^n}$

52. $\sum_{n=1}^{\infty}\frac{3^n+2^{2n}}{9^n}$

53. $\sum_{n=1}^{\infty}\frac{(-2)^n-5^{n+1}}{10^n}$

54. $\sum_{n=1}^{\infty}\frac{3^{n+1}-4^n+6^{n-1}}{12^{n+1}}$

55. $\sum_{n=1}^{\infty}\left(\frac{1}{1+\sqrt{3}}\right)^{n-1}$

◪ 다음 값을 구하여라.

56. 등비수열 $\{a_n\}$에 대하여 $a_1=3$, $a_2=1$일 때, $\sum_{n=1}^{\infty}(a_n)^2$의 값

57. 첫째항이 a이고 공비가 $\frac{1}{4}$인 등비수열 $\{a_n\}$에 대하여 $\sum_{n=1}^{\infty}a_n=16$일 때, a^2의 값

58. 첫째항이 2인 등비수열 $\{a_n\}$에 대하여 $\sum_{n=1}^{\infty}a_n=4$일 때, $\sum_{n=1}^{\infty}{a_n}^2$의 값

59. 공비가 $\frac{1}{5}$인 등비수열 $\{a_n\}$에 대하여 $\sum_{n=1}^{\infty}a_n=15$일 때, 첫째항 a_1의 값

60. 급수 $\sum_{n=1}^{\infty}r^{2n}$의 합이 4일 때, 급수 $\sum_{n=1}^{\infty}r^{4n-2}$의 합

족보닷컴 zocbo.com
Copyright (c) since 2000 EDUZONE Co.,Ltd all rights reserved
교육지대(주) 서울특별시 구로구 구로동 디지털로33길 55 이앤씨벤처드림타워2차 805호 대표전화 : 1544-5633 FAX : 02-521-0331

정답 및 해설

1) 3

⇨ $\sum_{n=1}^{\infty}\left(\frac{3}{4}\right)^n=\frac{\frac{3}{4}}{1-\frac{3}{4}}=3$

2) 20

⇨ 주어진 등비급수는 첫째항이 5, 공비가 $\frac{3}{4}$이므로

$\sum_{n=1}^{\infty}5\left(\frac{3}{4}\right)^{n-1}=\frac{5}{1-\frac{3}{4}}=20$

3) 2

⇨ 주어진 등비급수는 첫째항이 3, 공비가 $-\frac{1}{2}$이므로

$\sum_{n=1}^{\infty}3\left(-\frac{1}{2}\right)^{n-1}=\frac{3}{1-\left(-\frac{1}{2}\right)}=2$

4) 4

⇨ $\sum_{n=1}^{\infty}\frac{2^n+3^n}{4^n}=\sum_{n=1}^{\infty}\left\{\left(\frac{2}{4}\right)^n+\left(\frac{3}{4}\right)^n\right\}$

$=\sum_{n=1}^{\infty}\left(\frac{1}{2}\right)^n+\sum_{n=1}^{\infty}\left(\frac{3}{4}\right)^n$

$=\frac{\frac{1}{2}}{1-\frac{1}{2}}+\frac{\frac{3}{4}}{1-\frac{3}{4}}$

$=1+3=4$

5) $\frac{1}{2}$

⇨ $\sum_{n=1}^{\infty}\frac{1}{2^n}$은 첫째항이 $\frac{1}{2}$이고, 공비가 $\frac{1}{2}$인 등비급수이고, $\sum_{n=1}^{\infty}\frac{1}{3^n}$은 첫째항이 $\frac{1}{3}$, 공비가 $\frac{1}{3}$인 등비급수이다.

$\therefore \sum_{n=1}^{\infty}\left(\frac{1}{2^n}-\frac{1}{3^n}\right)=\sum_{n=1}^{\infty}\frac{1}{2^n}-\sum_{n=1}^{\infty}\frac{1}{3^n}$

$=\frac{\frac{1}{2}}{1-\frac{1}{2}}-\frac{\frac{1}{3}}{1-\frac{1}{3}}=1-\frac{1}{2}=\frac{1}{2}$

6) 4

⇨ $\sum_{n=1}^{\infty}\frac{3}{2^n}$은 첫째항이 $\frac{3}{2}$이고, 공비가 $\frac{1}{2}$인 등비급수이고, $\sum_{n=1}^{\infty}\frac{2}{3^n}$은 첫째항이 $\frac{2}{3}$, 공비가 $\frac{1}{3}$인 등비급수이다.

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

$=\frac{\frac{3}{2}}{1-\frac{1}{2}}+\frac{\frac{2}{3}}{1-\frac{1}{3}}=3+1=4$

7) 8

⇨ $\sum_{n=1}^{\infty}\left(\frac{2^{n+1}}{3^n}+\frac{4}{2^n}\right)=2\sum_{n=1}^{\infty}\left(\frac{2}{3}\right)^n+4\sum_{n=1}^{\infty}\left(\frac{1}{2}\right)^n$

$=\frac{\frac{4}{3}}{1-\frac{2}{3}}+\frac{2}{1-\frac{1}{2}}=4+4=8$

8) 4

⇨ $\sum_{n=1}^{\infty}\frac{1}{2^n}$은 첫째항이 $\frac{1}{2}$이고, 공비가 $\frac{1}{2}$인 등비급수이고, $\sum_{n=1}^{\infty}\frac{3^n}{4^n}$은 첫째항이 $\frac{3}{4}$, 공비가 $\frac{3}{4}$인 등비급수이다.

$\therefore \sum_{n=1}^{\infty}\left(\frac{1}{2^n}+\frac{3^n}{4^n}\right)=\sum_{n=1}^{\infty}\frac{1}{2^n}+\sum_{n=1}^{\infty}\frac{3^n}{4^n}$

$=\frac{\frac{1}{2}}{1-\frac{1}{2}}+\frac{\frac{3}{4}}{1-\frac{3}{4}}=1+3=4$

9) 0

⇨ $\sum_{n=1}^{\infty}\frac{3^n}{4^n}$은 첫째항이 $\frac{3}{4}$이고, 공비가 $\frac{3}{4}$인 등비급수이고, $\sum_{n=1}^{\infty}\frac{3}{2^n}$은 첫째항이 $\frac{3}{2}$, 공비가 $\frac{1}{2}$인 등비급수이다.

$\therefore \sum_{n=1}^{\infty}\left(\frac{3^n}{4^n}-\frac{3}{2^n}\right)=\sum_{n=1}^{\infty}\frac{3^n}{4^n}-\sum_{n=1}^{\infty}\frac{3}{2^n}$

$=\frac{\frac{3}{4}}{1-\frac{3}{4}}-\frac{\frac{3}{2}}{1-\frac{1}{2}}=3-3=0$

10) 1

⇨ $\sum_{n=1}^{\infty}\frac{4}{3^n}$은 첫째항이 $\frac{4}{3}$이고, 공비가 $\frac{1}{3}$인 등비급수이고, $\sum_{n=1}^{\infty}\frac{3}{4^n}$은 첫째항이 $\frac{3}{4}$, 공비가 $\frac{1}{4}$인 등비급수이다.

$\therefore \sum_{n=1}^{\infty}\left(\frac{4}{3^n}-\frac{3}{4^n}\right)=\sum_{n=1}^{\infty}\frac{4}{3^n}-\sum_{n=1}^{\infty}\frac{3}{4^n}$

$=\frac{\frac{4}{3}}{1-\frac{1}{3}}-\frac{\frac{3}{4}}{1-\frac{1}{4}}=2-1=1$

족보닷컴 zocbo.com
Copyright (c) since 2000 EDUZONE Co.,Ltd all rights reserved
교육지대(주) 서울특별시 구로구 구로동 디지털로33길 55 이앤씨벤처드림타워2차 805호 대표전화 : 1544-5633 FAX : 02-521-0331
I410-UCI(KEPA)-0199-2019-001-000244110

11) 5

⇨ $\sum_{n=1}^{\infty}\left(\frac{2^{n+1}}{4^n}+\frac{6}{3^n}\right)$

$=\sum_{n=1}^{\infty}2\times\left(\frac{1}{2}\right)^n+\sum_{n=1}^{\infty}6\times\left(\frac{1}{3}\right)^n$

$=\frac{1}{1-\frac{1}{2}}+\frac{2}{1-\frac{1}{3}}=2+3=5$

12) $\frac{8}{3}$

⇨ $\sum_{n=1}^{\infty}\frac{5}{4^n}$은 첫째항이 $\frac{5}{4}$이고, 공비가 $\frac{1}{4}$인 등비급수이고, $\sum_{n=1}^{\infty}\frac{4}{5^n}$은 첫째항이 $\frac{4}{5}$, 공비가 $\frac{1}{5}$인 등비급수이다.

$\therefore \sum_{n=1}^{\infty}\left(\frac{5}{4^n}+\frac{4}{5^n}\right)=\sum_{n=1}^{\infty}\frac{5}{4^n}+\sum_{n=1}^{\infty}\frac{4}{5^n}$

$=\frac{\frac{5}{4}}{1-\frac{1}{4}}+\frac{\frac{4}{5}}{1-\frac{1}{5}}=\frac{5}{3}+1=\frac{8}{3}$

13) $-\frac{22}{3}$

⇨ $\sum_{n=1}^{\infty}\frac{3}{4^n}$은 첫째항이 $\frac{3}{4}$이고, 공비가 $\frac{1}{4}$인 등비급수이고, $\sum_{n=1}^{\infty}\frac{2}{(-5)^{n-2}}$은 첫째항이 -10, 공비가 $-\frac{1}{5}$인 등비급수이다.

$\therefore \sum_{n=1}^{\infty}\left(\frac{3}{4^n}+\frac{2}{(-5)^{n-2}}\right)=\sum_{n=1}^{\infty}\frac{3}{4^n}+\sum_{n=1}^{\infty}\frac{2}{(-5)^{n-2}}$

$=\frac{\frac{3}{4}}{1-\frac{1}{4}}+\frac{-10}{1+\frac{1}{5}}=1-\frac{25}{3}=-\frac{22}{3}$

14) $\frac{7}{4}$

⇨ $\sum_{n=1}^{\infty}\frac{3}{5^n}$은 첫째항이 $\frac{3}{5}$, 공비가 $\frac{1}{5}$인 등비급수이고, $\sum_{n=1}^{\infty}\frac{2}{3^n}$는 첫째항이 $\frac{2}{3}$, 공비가 $\frac{1}{3}$인 등비급수이다.

$\therefore \sum_{n=1}^{\infty}\left(\frac{3}{5^n}+\frac{2}{3^n}\right)=\sum_{n=1}^{\infty}\frac{3}{5^n}+\sum_{n=1}^{\infty}\frac{2}{3^n}$

$=\frac{\frac{3}{5}}{1-\frac{1}{5}}+\frac{\frac{2}{3}}{1-\frac{1}{3}}$

$=\frac{3}{4}+1=\frac{7}{4}$

15) 1

⇨ $\sum_{n=1}^{\infty}\frac{3^n}{5^n}$은 첫째항이 $\frac{3}{5}$, 공비가 $\frac{3}{5}$인 등비급수이고, $\sum_{n=1}^{\infty}\frac{2}{(-3)^n}$는 첫째항이 $-\frac{2}{3}$, 공비가 $-\frac{1}{3}$인 등비급수이다.

$\therefore \sum_{n=1}^{\infty}\left(\frac{3^n}{5^n}+\frac{2}{(-3)^n}\right)=\sum_{n=1}^{\infty}\frac{3^n}{5^n}+\sum_{n=1}^{\infty}\frac{2}{(-3)^n}$

$=\frac{\frac{3}{5}}{1-\frac{3}{5}}+\frac{-\frac{2}{3}}{1+\frac{1}{3}}=\frac{3}{2}-\frac{1}{2}=1$

16) $\frac{23}{4}$

⇨ $\sum_{n=1}^{\infty}\left(\frac{1}{2^{n-1}}+\frac{3}{5^{n-1}}\right)$

$=\sum_{n=1}^{\infty}\left(\frac{1}{2}\right)^{n-1}+\sum_{n=1}^{\infty}3\times\left(\frac{1}{5}\right)^{n-1}$

$=\frac{1}{1-\frac{1}{2}}+\frac{3}{1-\frac{1}{5}}$

$=2+\frac{15}{4}=\frac{23}{4}$

17) $\frac{29}{4}$

⇨ $\sum_{n=1}^{\infty}\left(\frac{1}{5^{n-1}}+\frac{5}{6^{n-1}}\right)=\sum_{n=1}^{\infty}\left(\frac{1}{5}\right)^{n-1}+5\sum_{n=1}^{\infty}\left(\frac{1}{6}\right)^{n-1}$

$=\frac{1}{1-\frac{1}{5}}+\frac{5}{1-\frac{1}{6}}=\frac{5}{4}+6=\frac{29}{4}$

18) $\frac{1}{4}$

⇨ $\sum_{n=1}^{\infty}\frac{1+(-1)^n}{3^n}=\sum_{n=1}^{\infty}\left\{\left(\frac{1}{3}\right)^n+\left(-\frac{1}{3}\right)^n\right\}$

$=\sum_{n=1}^{\infty}\left(\frac{1}{3}\right)^n+\sum_{n=1}^{\infty}\left(-\frac{1}{3}\right)^n$

$=\frac{\frac{1}{3}}{1-\frac{1}{3}}+\frac{-\frac{1}{3}}{1+\frac{1}{3}}=\frac{1}{2}-\frac{1}{4}=\frac{1}{4}$

19) 20

⇨ $\sum_{n=1}^{\infty}8\left(\frac{1+2^n}{3^n}\right)=8\sum_{n=1}^{\infty}\left\{\left(\frac{1}{3}\right)^n+\left(\frac{2}{3}\right)^n\right\}$

$=8\sum_{n=1}^{\infty}\left(\frac{1}{3}\right)^n+8\sum_{n=1}^{\infty}\left(\frac{2}{3}\right)^n$

$=8\times\frac{\frac{1}{3}}{1-\frac{1}{3}}+8\times\frac{\frac{2}{3}}{1-\frac{2}{3}}=8\times\frac{1}{2}+8\times2=4+16=20$

족보닷컴 zocbo.com
Copyright (c) since 2000 EDUZONE Co.,Ltd all rights reserved
교육지대(주) 서울특별시 구로구 구로동 디지털로33길 55 이앤씨벤처드림타워2차 805호 대표전화 : 1544-5633 FAX : 02-521-0331
I410-UCI(KEPA)-0199-2019-001-000244110

20) $\frac{1}{10}$

$\Rightarrow \sum_{n=1}^{\infty}\frac{1+(-2)^n}{3^n}=\sum_{n=1}^{\infty}\left\{\left(\frac{1}{3}\right)^n+\left(-\frac{2}{3}\right)^n\right\}$

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

$=\frac{\frac{1}{3}}{1-\frac{1}{3}}+\frac{-\frac{2}{3}}{1+\frac{2}{3}}=\frac{1}{2}-\frac{2}{5}=\frac{1}{10}$

21) $\frac{8}{5}$

$\Rightarrow \sum_{n=1}^{\infty}\frac{2^n+(-2)^n}{3^n}=\sum_{n=1}^{\infty}\left\{\left(\frac{2}{3}\right)^n+\left(-\frac{2}{3}\right)^n\right\}$

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

$=\frac{\frac{2}{3}}{1-\frac{2}{3}}+\frac{-\frac{2}{3}}{1+\frac{2}{3}}=2-\frac{2}{5}=\frac{8}{5}$

22) $\frac{4}{3}$

$\Rightarrow \sum_{n=1}^{\infty}\frac{2^n+1}{4^n}=\sum_{n=1}^{\infty}\left\{\left(\frac{2}{4}\right)^n+\left(\frac{1}{4}\right)^n\right\}$

$=\sum_{n=1}^{\infty}\left(\frac{1}{2}\right)^n+\sum_{n=1}^{\infty}\left(\frac{1}{4}\right)^n$

$=\frac{\frac{1}{2}}{1-\frac{1}{2}}+\frac{\frac{1}{4}}{1-\frac{1}{4}}=1+\frac{1}{3}=\frac{4}{3}$

23) $\frac{2}{3}$

$\Rightarrow \sum_{n=1}^{\infty}\frac{2^n-1}{4^n}=\sum_{n=1}^{\infty}\left\{\left(\frac{2}{4}\right)^n-\left(\frac{1}{4}\right)^n\right\}$

$=\sum_{n=1}^{\infty}\left(\frac{1}{2}\right)^n-\sum_{n=1}^{\infty}\left(\frac{1}{4}\right)^n$

$=\frac{\frac{1}{2}}{1-\frac{1}{2}}-\frac{\frac{1}{4}}{1-\frac{1}{4}}=1-\frac{1}{3}=\frac{2}{3}$

24) $\frac{7}{3}$

$\Rightarrow \sum_{n=1}^{\infty}\frac{1+2^{n+1}}{4^n}=\sum_{n=1}^{\infty}\left\{\left(\frac{1}{4}\right)^n+2\left(\frac{2}{4}\right)^n\right\}$

$=\sum_{n=1}^{\infty}\left(\frac{1}{4}\right)^n+2\sum_{n=1}^{\infty}\left(\frac{1}{2}\right)^n$

$=\frac{\frac{1}{4}}{1-\frac{1}{4}}+2\times\frac{\frac{1}{2}}{1-\frac{1}{2}}=\frac{1}{3}+2\times1=\frac{7}{3}$

25) $\frac{14}{3}$

$\Rightarrow \sum_{n=1}^{\infty}\frac{3^n+5}{4^n}=\sum_{n=1}^{\infty}\left\{\left(\frac{3}{4}\right)^n+5\left(\frac{1}{4}\right)^n\right\}$

$=\sum_{n=1}^{\infty}\left(\frac{3}{4}\right)^n+5\sum_{n=1}^{\infty}\left(\frac{1}{4}\right)^n$

$=\frac{\frac{3}{4}}{1-\frac{3}{4}}+5\times\frac{\frac{1}{4}}{1-\frac{1}{4}}=3+5\times\frac{1}{3}=\frac{14}{3}$

26) 4

$\Rightarrow \sum_{n=1}^{\infty}\frac{2^n+3^n}{4^n}=\sum_{n=1}^{\infty}\left\{\left(\frac{1}{2}\right)^n+\left(\frac{3}{4}\right)^n\right\}$

$=\sum_{n=1}^{\infty}\left(\frac{1}{2}\right)^n+\sum_{n=1}^{\infty}\left(\frac{3}{4}\right)^n$

$=\frac{\frac{1}{2}}{1-\frac{1}{2}}+\frac{\frac{3}{4}}{1-\frac{3}{4}}=1+3=4$

27) 2

$\Rightarrow \sum_{n=1}^{\infty}\frac{3^n-2^n}{4^n}=\sum_{n=1}^{\infty}\left\{\left(\frac{3}{4}\right)^n-\left(\frac{2}{4}\right)^n\right\}$

$=\sum_{n=1}^{\infty}\left(\frac{3}{4}\right)^n-\sum_{n=1}^{\infty}\left(\frac{1}{2}\right)^n$

$=\frac{\frac{3}{4}}{1-\frac{3}{4}}-\frac{\frac{1}{2}}{1-\frac{1}{2}}=3-1=2$

28) $\frac{19}{2}$

$\Rightarrow \sum_{n=1}^{\infty}\frac{2^{n-1}+3^{n+1}}{4^n}=\sum_{n=1}^{\infty}\left\{\frac{1}{4}\left(\frac{2}{4}\right)^{n-1}+3\left(\frac{3}{4}\right)^n\right\}$

$=\frac{1}{4}\sum_{n=1}^{\infty}\left(\frac{1}{2}\right)^{n-1}+3\sum_{n=1}^{\infty}\left(\frac{3}{4}\right)^n$

$=\frac{1}{4}\times\frac{1}{1-\frac{1}{2}}+3\times\frac{\frac{3}{4}}{1-\frac{3}{4}}=\frac{1}{4}\times2+3\times3=\frac{1}{2}+9=\frac{19}{2}$

29) 8

$\Rightarrow \sum_{n=1}^{\infty}\frac{3^{n+1}-3^{n-1}}{4^n}=\sum_{n=1}^{\infty}\left\{3\left(\frac{3}{4}\right)^n-\frac{1}{4}\left(\frac{3}{4}\right)^{n-1}\right\}$

$=3\sum_{n=1}^{\infty}\left(\frac{3}{4}\right)^n-\frac{1}{4}\sum_{n=1}^{\infty}\left(\frac{3}{4}\right)^{n-1}$

$=3\times\frac{\frac{3}{4}}{1-\frac{3}{4}}-\frac{1}{4}\times\frac{1}{1-\frac{3}{4}}$

$=3\times3-\frac{1}{4}\times4=9-1=8$

족보닷컴 zocbo.com
Copyright (c) since 2000 EDUZONE Co.,Ltd all rights reserved
교육지대(주) 서울특별시 구로구 구로동 디지털로33길 55 이앤씨벤처드림타워2차 805호 대표전화 : 1544-5633 FAX : 02-521-0331

30) $\frac{15}{4}$

$\Rightarrow \sum_{n=1}^{\infty}\frac{2^{2n}-1}{5^n}=\sum_{n=1}^{\infty}\left\{\left(\frac{4}{5}\right)^n-\left(\frac{1}{5}\right)^n\right\}$

$=\sum_{n=1}^{\infty}\left(\frac{4}{5}\right)^n-\sum_{n=1}^{\infty}\left(\frac{1}{5}\right)^n$

$=\frac{\frac{4}{5}}{1-\frac{4}{5}}-\frac{\frac{1}{5}}{1-\frac{1}{5}}$

$=4-\frac{1}{4}=\frac{15}{4}$

31) $-\frac{1}{8}$

$\Rightarrow \sum_{n=1}^{\infty}\frac{1+(-3)^n}{5^n}=\sum_{n=1}^{\infty}\left\{\left(\frac{1}{5}\right)^n+\left(-\frac{3}{5}\right)^n\right\}$

$=\sum_{n=1}^{\infty}\left(\frac{1}{5}\right)^n+\sum_{n=1}^{\infty}\left(-\frac{3}{5}\right)^n$

$=\frac{\frac{1}{5}}{1-\frac{1}{5}}+\frac{-\frac{3}{5}}{1+\frac{3}{5}}=\frac{1}{4}-\frac{3}{8}=-\frac{1}{8}$

32) $\frac{7}{4}$

$\Rightarrow \sum_{n=1}^{\infty}\frac{3^n+1}{5^n}=\sum_{n=1}^{\infty}\left\{\left(\frac{3}{5}\right)^n+\left(\frac{1}{5}\right)^n\right\}$

$=\sum_{n=1}^{\infty}\left(\frac{3}{5}\right)^n+\sum_{n=1}^{\infty}\left(\frac{1}{5}\right)^n$

$=\frac{\frac{3}{5}}{1-\frac{3}{5}}+\frac{\frac{1}{5}}{1-\frac{1}{5}}=\frac{3}{2}+\frac{1}{4}=\frac{7}{4}$

33) $\frac{5}{4}$

$\Rightarrow \sum_{n=1}^{\infty}\frac{3^n-1}{5^n}=\sum_{n=1}^{\infty}\left\{\left(\frac{3}{5}\right)^n-\left(\frac{1}{5}\right)^n\right\}$

$=\sum_{n=1}^{\infty}\left(\frac{3}{5}\right)^n-\sum_{n=1}^{\infty}\left(\frac{1}{5}\right)^n$

$=\frac{\frac{3}{5}}{1-\frac{3}{5}}-\frac{\frac{1}{5}}{1-\frac{1}{5}}=\frac{3}{2}-\frac{1}{4}=\frac{5}{4}$

34) $-\frac{5}{6}$

$\Rightarrow \sum_{n=1}^{\infty}\frac{2^n-3^n}{5^n}=\sum_{n=1}^{\infty}\left\{\left(\frac{2}{5}\right)^n-\left(\frac{3}{5}\right)^n\right\}$

$=\sum_{n=1}^{\infty}\left(\frac{2}{5}\right)^n-\sum_{n=1}^{\infty}\left(\frac{3}{5}\right)^n$

$=\frac{\frac{2}{5}}{1-\frac{2}{5}}-\frac{\frac{3}{5}}{1-\frac{3}{5}}=\frac{2}{3}-\frac{3}{2}=-\frac{5}{6}$

35) $\frac{26}{7}$

$\Rightarrow \sum_{n=1}^{\infty}\frac{4^n+(-2)^n}{5^n}=\sum_{n=1}^{\infty}\left\{\left(\frac{4}{5}\right)^n+\left(-\frac{2}{5}\right)^n\right\}$

$=\sum_{n=1}^{\infty}\left(\frac{4}{5}\right)^n+\sum_{n=1}^{\infty}\left(-\frac{2}{5}\right)^n$

$=\frac{\frac{4}{5}}{1-\frac{4}{5}}+\frac{-\frac{2}{5}}{1+\frac{2}{5}}$

$=4-\frac{2}{7}=\frac{26}{7}$

36) $\frac{14}{3}$

$\Rightarrow \sum_{n=1}^{\infty}\frac{2^n+4^n}{5^n}=\sum_{n=1}^{\infty}\left\{\left(\frac{2}{5}\right)^n+\left(\frac{4}{5}\right)^n\right\}$

$=\sum_{n=1}^{\infty}\left(\frac{2}{5}\right)^n+\sum_{n=1}^{\infty}\left(\frac{4}{5}\right)^n$

$=\frac{\frac{2}{5}}{1-\frac{2}{5}}+\frac{\frac{4}{5}}{1-\frac{4}{5}}$

$=\frac{2}{3}+4=\frac{14}{3}$

37) $\frac{11}{2}$

$\Rightarrow \sum_{n=1}^{\infty}\frac{3^n+4^n}{5^n}=\sum_{n=1}^{\infty}\left\{\left(\frac{3}{5}\right)^n+\left(\frac{4}{5}\right)^n\right\}$

$=\sum_{n=1}^{\infty}\left(\frac{3}{5}\right)^n+\sum_{n=1}^{\infty}\left(\frac{4}{5}\right)^n$

$=\frac{\frac{3}{5}}{1-\frac{3}{5}}+\frac{\frac{4}{5}}{1-\frac{4}{5}}$

$=\frac{3}{2}+4=\frac{11}{2}$

38) $\frac{11}{6}$

$\Rightarrow \sum_{n=1}^{\infty}\frac{2^{n-1}+3^n}{5^n}=\sum_{n=1}^{\infty}\left\{\frac{1}{5}\left(\frac{2}{5}\right)^{n-1}+\left(\frac{3}{5}\right)^n\right\}$

$=\frac{1}{5}\sum_{n=1}^{\infty}\left(\frac{2}{5}\right)^{n-1}+\sum_{n=1}^{\infty}\left(\frac{3}{5}\right)^n$

$=\frac{1}{5}\times\frac{1}{1-\frac{2}{5}}+\frac{\frac{3}{5}}{1-\frac{3}{5}}$

Copyright (c) since 2000 EDUZONE Co.,Ltd all rights reserved
교육지대(주) 서울특별시 구로구 구로동 디지털로33길 55 이앤씨벤처드림타워2차 805호 대표전화 : 1544-5633 FAX : 02-521-0331

$=\frac{1}{5}\times\frac{5}{3}+\frac{3}{2}=\frac{11}{6}$

39) 7

$⇨\ \sum_{n=1}^{\infty}\frac{2\cdot 3^n+(-2)^{2n}}{5^n}=\sum_{n=1}^{\infty}\left\{2\left(\frac{3}{5}\right)^n+\left(\frac{4}{5}\right)^n\right\}$

$=2\sum_{n=1}^{\infty}\left(\frac{3}{5}\right)^n+\sum_{n=1}^{\infty}\left(\frac{4}{5}\right)^n$

$=2\times\frac{\frac{3}{5}}{1-\frac{3}{5}}+\frac{\frac{4}{5}}{1-\frac{4}{5}}$

$=2\times\frac{3}{2}+4=7$

40) $\frac{7}{10}$

$⇨\ \sum_{n=1}^{\infty}\frac{1+2^n}{6^n}$

$=\sum_{n=1}^{\infty}\left\{\left(\frac{1}{6}\right)^n+\left(\frac{2}{6}\right)^n\right\}$

$=\sum_{n=1}^{\infty}\left(\frac{1}{6}\right)^n+\sum_{n=1}^{\infty}\left(\frac{1}{3}\right)^n$

$=\frac{\frac{1}{6}}{1-\frac{1}{6}}+\frac{\frac{1}{3}}{1-\frac{1}{3}}=\frac{1}{5}+\frac{1}{2}=\frac{7}{10}$

41) $\frac{1}{2}$

$⇨\ \sum_{n=1}^{\infty}\frac{3^n-2^n}{6^n}=\sum_{n=1}^{\infty}\left\{\left(\frac{3}{6}\right)^n-\left(\frac{2}{6}\right)^n\right\}$

$=\sum_{n=1}^{\infty}\left(\frac{1}{2}\right)^n-\sum_{n=1}^{\infty}\left(\frac{1}{3}\right)^n$

$=\frac{\frac{1}{2}}{1-\frac{1}{2}}-\frac{\frac{1}{3}}{1-\frac{1}{3}}=1-\frac{1}{2}=\frac{1}{2}$

42) 3

$⇨\ \sum_{n=1}^{\infty}\frac{3^n+4^n}{6^n}=\sum_{n=1}^{\infty}\left\{\left(\frac{3}{6}\right)^n+\left(\frac{4}{6}\right)^n\right\}$

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

$=\frac{\frac{1}{2}}{1-\frac{1}{2}}+\frac{\frac{2}{3}}{1-\frac{2}{3}}=1+2=3$

43) 3

$⇨\ \sum_{n=1}^{\infty}\frac{2^{n+1}+4^n}{6^n}$

$=\sum_{n=1}^{\infty}\left\{2\left(\frac{2}{6}\right)^n+\left(\frac{4}{6}\right)^n\right\}$

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

$=2\times\frac{\frac{1}{3}}{1-\frac{1}{3}}+\frac{\frac{2}{3}}{1-\frac{2}{3}}=2\times\frac{1}{2}+2=3$

44) $\frac{5}{4}$

$⇨\ \sum_{n=1}^{\infty}\frac{2^{n-1}+3^n}{6^n}$

$=\sum_{n=1}^{\infty}\left\{\frac{1}{6}\left(\frac{2}{6}\right)^{n-1}+\left(\frac{3}{6}\right)^n\right\}$

$=\frac{1}{6}\sum_{n=1}^{\infty}\left(\frac{1}{3}\right)^{n-1}+\sum_{n=1}^{\infty}\left(\frac{1}{2}\right)^n$

$=\frac{1}{6}\times\frac{1}{1-\frac{1}{3}}+\frac{\frac{1}{2}}{1-\frac{1}{2}}=\frac{1}{6}\times\frac{3}{2}+1=\frac{5}{4}$

45) $\frac{2}{3}$

$⇨\ \sum_{n=1}^{\infty}\frac{2^{n+1}+(-3)^n}{6^n}$

$=\sum_{n=1}^{\infty}\left\{2\left(\frac{2}{6}\right)^n+\left(-\frac{3}{6}\right)^n\right\}$

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

$=2\times\frac{\frac{1}{3}}{1-\frac{1}{3}}+\frac{-\frac{1}{2}}{1+\frac{1}{2}}=2\times\frac{1}{2}-\frac{1}{3}=\frac{2}{3}$

46) $\frac{26}{5}$

$⇨\ \sum_{n=1}^{\infty}\frac{1+5^n}{6^n}=\sum_{n=1}^{\infty}\left\{\left(\frac{1}{6}\right)^n+\left(\frac{5}{6}\right)^n\right\}$

$=\sum_{n=1}^{\infty}\left(\frac{1}{6}\right)^n+\sum_{n=1}^{\infty}\left(\frac{5}{6}\right)^n$

$=\frac{\frac{1}{6}}{1-\frac{1}{6}}+\frac{\frac{5}{6}}{1-\frac{5}{6}}=\frac{1}{5}+5=\frac{26}{5}$

47) $\frac{36}{7}$

$⇨\ \sum_{n=1}^{\infty}\frac{5^n+(-1)^{n-1}}{6^n}$

$=\sum_{n=1}^{\infty}\left\{\left(\frac{5}{6}\right)^n+\frac{1}{6}\left(-\frac{1}{6}\right)^{n-1}\right\}$

$=\sum_{n=1}^{\infty}\left(\frac{5}{6}\right)^n+\sum_{n=1}^{\infty}\frac{1}{6}\left(-\frac{1}{6}\right)^{n-1}$

족보닷컴 zocbo.com
Copyright (c) since 2000 EDUZONE Co,.Ltd all rights reserved
교육지대(주) 서울특별시 구로구 구로동 디지털로33길 55 이앤씨벤처드림타워2차 805호 대표전화 : 1544-5633 FAX : 02-521-0331

$$=\frac{\frac{5}{6}}{1-\frac{5}{6}}+\frac{\frac{1}{6}}{1-\left(-\frac{1}{6}\right)}=5+\frac{1}{7}=\frac{36}{7}$$

48) $\frac{7}{2}$

⇨ $\sum_{n=1}^{\infty}\frac{2^{n-1}+3^{n-1}}{6^{n-1}}$

$=\sum_{n=1}^{\infty}\left\{\left(\frac{2}{6}\right)^{n-1}+\left(\frac{3}{6}\right)^{n-1}\right\}$

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

$=\frac{1}{1-\frac{1}{3}}+\frac{1}{1-\frac{1}{2}}=\frac{3}{2}+2=\frac{7}{2}$

49) $\frac{1}{9}$

⇨ $\sum_{n=1}^{\infty}\frac{2^{n+1}-3^{n-1}}{6^{n+1}}$

$=\sum_{n=1}^{\infty}\left\{\left(\frac{2}{6}\right)^{n+1}-\frac{1}{36}\times\left(\frac{3}{6}\right)^{n-1}\right\}$

$=\sum_{n=1}^{\infty}\left(\frac{1}{3}\right)^{n+1}-\frac{1}{36}\times\sum_{n=1}^{\infty}\left(\frac{1}{2}\right)^{n-1}$

$=\frac{\frac{1}{9}}{1-\frac{1}{3}}-\frac{1}{36}\times\frac{1}{1-\frac{1}{2}}=\frac{1}{6}-\frac{1}{36}\times 2=\frac{2}{18}=\frac{1}{9}$

50) $\frac{34}{11}$

⇨ $\sum_{n=1}^{\infty}\frac{3^{n+1}+(-5)^{n-1}}{6^n}$

$=\sum_{n=1}^{\infty}\left\{3\times\left(\frac{3}{6}\right)^n+\frac{1}{6}\times\left(\frac{-5}{6}\right)^{n-1}\right\}$

$=\sum_{n=1}^{\infty}3\times\left(\frac{1}{2}\right)^n+\sum_{n=1}^{\infty}\frac{1}{6}\times\left(-\frac{5}{6}\right)^{n-1}$

$=\frac{\frac{3}{2}}{1-\frac{1}{2}}+\frac{\frac{1}{6}}{1+\frac{5}{6}}=3+\frac{1}{11}=\frac{34}{11}$

51) $\frac{7}{20}$

⇨ $\sum_{n=1}^{\infty}\frac{3^n-2^n}{7^n}=\sum_{n=1}^{\infty}\left\{\left(\frac{3}{7}\right)^n-\left(\frac{2}{7}\right)^n\right\}$

$=\sum_{n=1}^{\infty}\left(\frac{3}{7}\right)^n-\sum_{n=1}^{\infty}\left(\frac{2}{7}\right)^n$

$=\frac{\frac{3}{7}}{1-\frac{3}{7}}-\frac{\frac{2}{7}}{1-\frac{2}{7}}=\frac{3}{4}-\frac{2}{5}=\frac{7}{20}$

52) $\frac{13}{10}$

⇨ $\sum_{n=1}^{\infty}\frac{3^n+2^{2n}}{9^n}=\sum_{n=1}^{\infty}\left\{\left(\frac{3}{9}\right)^n+\left(\frac{4}{9}\right)^n\right\}$

$=\sum_{n=1}^{\infty}\left(\frac{1}{3}\right)^n+\sum_{n=1}^{\infty}\left(\frac{4}{9}\right)^n$

$=\frac{\frac{1}{3}}{1-\frac{1}{3}}+\frac{\frac{4}{9}}{1-\frac{4}{9}}=\frac{1}{2}+\frac{4}{5}=\frac{13}{10}$

53) $-\frac{31}{6}$

⇨ $\sum_{n=1}^{\infty}\frac{(-2)^n-5^{n+1}}{10^n}$

$=\sum_{n=1}^{\infty}\left\{\left(-\frac{2}{10}\right)^n-5\times\left(\frac{5}{10}\right)^n\right\}$

$=\sum_{n=1}^{\infty}\left(-\frac{1}{5}\right)^n-5\sum_{n=1}^{\infty}\left(\frac{1}{2}\right)^n$

$=\frac{-\frac{1}{5}}{1+\frac{1}{5}}-5\times\frac{\frac{1}{2}}{1-\frac{1}{2}}=-\frac{1}{6}-5\times 1=-\frac{31}{6}$

54) $\frac{1}{18}$

⇨ $\sum_{n=1}^{\infty}\frac{3^{n+1}-4^n+6^{n-1}}{12^{n+1}}$

$=\sum_{n=1}^{\infty}\left\{\left(\frac{3}{12}\right)^{n+1}-\frac{1}{12}\times\left(\frac{4}{12}\right)^n+\frac{1}{144}\times\left(\frac{6}{12}\right)^{n-1}\right\}$

$=\sum_{n=1}^{\infty}\left(\frac{1}{4}\right)^{n+1}-\frac{1}{12}\times\sum_{n=1}^{\infty}\left(\frac{1}{3}\right)^n+\frac{1}{144}\times\sum_{n=1}^{\infty}\left(\frac{1}{2}\right)^{n-1}$

$=\frac{\frac{1}{16}}{1-\frac{1}{4}}-\frac{1}{12}\times\frac{\frac{1}{3}}{1-\frac{1}{3}}+\frac{1}{144}\times\frac{1}{1-\frac{1}{2}}$

$=\frac{1}{12}-\frac{1}{12}\times\frac{1}{2}+\frac{1}{144}\times 2=\frac{1}{12}-\frac{1}{24}+\frac{1}{72}=\frac{4}{72}=\frac{1}{18}$

55) $\frac{3+\sqrt{3}}{3}$

⇨ $\sum_{n=1}^{\infty}\left(\frac{1}{1+\sqrt{3}}\right)^{n-1}=\frac{1}{1-\frac{1}{1+\sqrt{3}}}=\frac{1}{\frac{\sqrt{3}}{1+\sqrt{3}}}$

$=\frac{1+\sqrt{3}}{\sqrt{3}}=\frac{3+\sqrt{3}}{3}$

56) $\frac{81}{8}$

⇨ 등비수열 $\{a_n\}$의 공비를 r라고 하면

$r=\frac{a_2}{a_1}=\frac{1}{3}\quad\therefore a_n=3\cdot\left(\frac{1}{3}\right)^{n-1}$

$(a_n)^2=\left\{3\cdot\left(\frac{1}{3}\right)^{n-1}\right\}^2=9\cdot\left(\frac{1}{9}\right)^{n-1}$

Copyright (c) since 2000 EDUZONE Co.,Ltd all rights reserved
교육지대(주) 서울특별시 구로구 구로동 디지털로33길 55 이앤씨벤처드림타워2차 805호 대표전화 : 1544-5633 FAX : 02-521-0331
I410-UCI(KEPA)-0199-2019-001-000244110

$\therefore \sum_{n=1}^{\infty}(a_n)^2 = \frac{9}{1-\frac{1}{9}} = \frac{81}{8}$

57) 144

⇨ $\sum_{n=1}^{\infty}a_n = \frac{a}{1-r} = \frac{a}{1-\frac{1}{4}} = 16$에서

$a = 16 \times \frac{3}{4} = 12 \quad \therefore a^2 = 144$

58) $\frac{16}{3}$

⇨ 등비수열 $\{a_n\}$의 공비를 r라 하면

$\sum_{n=1}^{\infty}a_n = \frac{2}{1-r} = 4 \quad \therefore r = \frac{1}{2}$

이때, $\sum_{n=1}^{\infty}{a_n}^2$은 첫째항이 $2^2 = 4$이고

공비는 $r^2 = \left(\frac{1}{2}\right)^2 = \frac{1}{4}$인 등비급수이므로

$\sum_{n=1}^{\infty}{a_n}^2 = \frac{4}{1-\frac{1}{4}} = \frac{16}{3}$

59) 12

⇨ 등비수열 $\{a_n\}$의 첫째항이 a_1,

공비가 $\frac{1}{5}$이므로 $\sum_{n=1}^{\infty}a_n = \frac{a_1}{1-\frac{1}{5}} = \frac{5}{4}a_1$

즉, $\frac{5}{4}a_1 = 15$이므로 $a_1 = 12$

60) $\frac{20}{9}$

⇨ 급수 $\sum_{n=1}^{\infty}r^{2n}$의 합이 4이므로

$0 < r^2 < 1$, $r \neq 0$이고, $\sum_{n=1}^{\infty}r^{2n} = \frac{r^2}{1-r^2} = 4$에서

$r^2 = 4 - 4r^2 \quad \therefore r^2 = \frac{4}{5}$

급수 $\sum_{n=1}^{\infty}r^{4n-2} = r^2 + r^6 + r^{10} + \cdots$은 첫째항이 $r^2 = \frac{4}{5}$,

공비가 $r^4 = \frac{16}{25}$인 등비급수이므로 구하는 합은

$\frac{\frac{4}{5}}{1-\frac{16}{25}} = \frac{20}{9}$

족보닷컴 zocbo.com
Copyright (c) since 2000 EDUZONE Co.,Ltd all rights reserved
교육지대(주) 서울특별시 구로구 구로동 디지털로33길 55 이앤씨벤처드림타워2차 805호 대표전화 : 1544-5633 FAX : 02-521-0331
I410-UCI(KEPA)-0199-2019-001-000244110