Recursive Formula – Day 3

Unit 7: Representations of Exponential Relations

Identify the first term of the sequence and the common ratio, and then find the recursive formula.

1. 4, 8, 16, 32, ...

$r = \frac{8}{4} = 2$ $\quad a_n = a_{n-1} \cdot r$

$a_1 = 4$ $\quad a_n = a_{n-1} \cdot 2$

2. −2.5, −10, −40, −160, ...

$r = \frac{-10}{-2.5} = 4$ $\quad a_n = a_{n-1} \cdot r$

$a_1 = -2.5$ $\quad a_n = a_{n-1} \cdot 4$

3. −1.5, −6, −24, −96, ...

$r = \frac{-6}{-1.5} = 4$ $\quad a_n = a_{n-1} \cdot r$

$a_1 = -1.5$ $\quad a_n = a_{n-1} \cdot 4$

4. 2, −8, 32, −128, ...

$r = \frac{-8}{2} = -4$ $\quad a_n = a_{n-1} \cdot r$

$a_1 = 2$ $\quad a_n = a_{n-1} \cdot -4$

5. 0.5, −1, 2, −4, ...

$r = \frac{-1}{0.5} = -2$ $\quad a_n = a_{n-1} \cdot r$

$a_1 = 0.5$ $\quad a_n = a_{n-1} \cdot -2$

6. −3, −9, −27, −81, ...

$r = \frac{-9}{-3} = 3$ $\quad a_n = a_{n-1} \cdot r$

$a_1 = -3$ $\quad a_n = a_{n-1} \cdot 3$

7. $-2, \frac{2}{3}, -\frac{2}{9}, \frac{2}{27}, \ldots$

$a_n = a_{n-1} \cdot r$

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

$a_1 = -2$ $\quad a_n = a_{n-1} \cdot -\frac{1}{3}$

8. 2, 4, 8, 16, ...

$r = \frac{4}{2} = 2$ $\quad a_n = a_{n-1} \cdot r$

$a_1 = 2$ $\quad a_n = a_{n-1} \cdot 2$

9. 64, 32, 16, 8, ...

$r = \frac{32}{64} = \frac{1}{2}$ $\quad a_n = a_{n-1} \cdot r$

$a_1 = 64$ $\quad a_n = a_{n-1} \cdot \frac{1}{2}$

10. −4, −24, −144, −864, ...

$r = \frac{-24}{-4} = 6$ $\quad a_n = a_{n-1} \cdot r$

$a_1 = -4$ $\quad a_n = a_{n-1} \cdot 6$

11. $1, -4, 16, -64, \ldots$

$r = \frac{-4}{1} = -4$ $\quad a_n = a_{n-1} \cdot r$

$a_1 = 1$ $\quad a_n = a_{n-1} \cdot -4$

12. $-1, -3, -9, -27, \ldots$

$r = \frac{-3}{-1} = 3$ $\quad a_n = a_{n-1} \cdot r$

$a_1 = -1$ $\quad a_n = a_{n-1} \cdot 3$

13. $-1.25, 5, -20, 80, \ldots$

$r = \frac{5}{-1.25} = -4$ $\quad a_n = a_{n-1} \cdot r$

$a_1 = -1.25$ $\quad a_n = a_{n-1} \cdot -4$

14. $\frac{3}{2}, -\frac{3}{8}, \frac{3}{32}, -\frac{3}{128}, \ldots$ $\quad a_n = a_{n-1} \cdot r$

$r = \frac{-3/8}{3/2} = \frac{-3}{8} \cdot \frac{2}{3} = \frac{-1}{4}$

$a_1 = \frac{3}{2}$ $\quad a_n = a_{n-1} \cdot \frac{-1}{4}$

15. $3, 18, 108, 648, \ldots$

$r = \frac{18}{3} = 6$ $\quad a_n = a_{n-1} \cdot r$

$a_1 = 3$ $\quad a_n = a_{n-1} \cdot 6$

16. $0.4, 2, 10, 50, \ldots$

$r = \frac{2}{0.4} = 5$ $\quad a_n = a_{n-1} \cdot r$

$a_1 = 0.4$ $\quad a_n = a_{n-1} \cdot 5$

17. $3, -2, \frac{4}{3}, -\frac{8}{9}, \ldots$

$r = \frac{-2}{3}$ $\quad a_n = a_{n-1} \cdot r$

$a_1 = 3$ $\quad a_n = a_{n-1} \cdot \frac{-2}{3}$

18. $-1, 5, -25, 125, \ldots$

$r = \frac{5}{-1} = -5$ $\quad a_n = a_{n-1} \cdot r$

$a_1 = -1$ $\quad a_n = a_{n-1} \cdot -5$

19. $-4, 8, -16, 32, \ldots$

$r = \frac{8}{-4} = -2$ $\quad a_n = a_{n-1} \cdot r$

$a_1 = -4$ $\quad a_n = a_{n-1} \cdot -2$

20. $2, -10, 50, -250, \ldots$

$r = \frac{-10}{2} = -5$ $\quad a_n = a_{n-1} \cdot r$

$a_1 = 2$ $\quad a_n = a_{n-1} \cdot -5$