

**Recursive Formula – Day 2**  
Unit 7: Representations of Exponential Relations

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

<p>1. 2, -4, 8, -16 ...</p> $r = \frac{-4}{2} = -2 \quad a_n = a_{n-1} \cdot r$ <div style="display: flex; justify-content: space-around;"> <div style="border: 1px solid black; padding: 5px;"><math>a_1 = 2</math></div> <div style="border: 1px solid red; padding: 5px;"><math>a_n = a_{n-1} \cdot -2</math></div> </div>	<p>2. 8, 4, 2, 1, ...</p> $r = \frac{4}{8} = \frac{1}{2} \quad a_n = a_{n-1} \cdot r$ <div style="display: flex; justify-content: space-around;"> <div style="border: 1px solid black; padding: 5px;"><math>a_1 = 8</math></div> <div style="border: 1px solid red; padding: 5px;"><math>a_n = a_{n-1} \cdot \frac{1}{2}</math></div> </div>
<p>3. -2, 4, -8, 16, ...</p> $r = \frac{4}{-2} = -2 \quad a_n = a_{n-1} \cdot r$ <div style="display: flex; justify-content: space-around;"> <div style="border: 1px solid black; padding: 5px;"><math>a_1 = -2</math></div> <div style="border: 1px solid red; padding: 5px;"><math>a_n = a_{n-1} \cdot -2</math></div> </div>	<p>4. 1, 6, 36, 216, ...</p> $r = \frac{6}{1} = 6 \quad a_n = a_{n-1} \cdot r$ <div style="display: flex; justify-content: space-around;"> <div style="border: 1px solid black; padding: 5px;"><math>a_1 = 1</math></div> <div style="border: 1px solid red; padding: 5px;"><math>a_n = a_{n-1} \cdot 6</math></div> </div>
<p>5. 2, 12, 72, 432, ...</p> $r = \frac{12}{2} = 6 \quad a_n = a_{n-1} \cdot r$ <div style="display: flex; justify-content: space-around;"> <div style="border: 1px solid black; padding: 5px;"><math>a_1 = 2</math></div> <div style="border: 1px solid red; padding: 5px;"><math>a_n = a_{n-1} \cdot 6</math></div> </div>	<p>6. 1, 2, 4, 8, ...</p> $r = \frac{2}{1} = 2 \quad a_n = a_{n-1} \cdot r$ <div style="display: flex; justify-content: space-around;"> <div style="border: 1px solid black; padding: 5px;"><math>a_1 = 1</math></div> <div style="border: 1px solid red; padding: 5px;"><math>a_n = a_{n-1} \cdot 2</math></div> </div>
<p>7. -4, -12, -36, -108, ...</p> $r = \frac{-12}{-4} = 3 \quad a_n = a_{n-1} \cdot r$ <div style="display: flex; justify-content: space-around;"> <div style="border: 1px solid black; padding: 5px;"><math>a_1 = -4</math></div> <div style="border: 1px solid red; padding: 5px;"><math>a_n = a_{n-1} \cdot 3</math></div> </div>	<p>8. -2, -12, -72, -432, ...</p> $r = \frac{-12}{-2} = 6 \quad a_n = a_{n-1} \cdot r$ <div style="display: flex; justify-content: space-around;"> <div style="border: 1px solid black; padding: 5px;"><math>a_1 = -2</math></div> <div style="border: 1px solid red; padding: 5px;"><math>a_n = a_{n-1} \cdot 6</math></div> </div>
<p>9. 4, -12, 36, -108, ...</p> $r = \frac{-12}{4} = -3 \quad a_n = a_{n-1} \cdot r$ <div style="display: flex; justify-content: space-around;"> <div style="border: 1px solid black; padding: 5px;"><math>a_1 = 4</math></div> <div style="border: 1px solid red; padding: 5px;"><math>a_n = a_{n-1} \cdot -3</math></div> </div>	<p>10. 0.6, 3, 15, 75, ...</p> $r = \frac{3}{0.6} = 5 \quad a_n = a_{n-1} \cdot r$ <div style="display: flex; justify-content: space-around;"> <div style="border: 1px solid black; padding: 5px;"><math>a_1 = 0.6</math></div> <div style="border: 1px solid red; padding: 5px;"><math>a_n = a_{n-1} \cdot 5</math></div> </div>

11. -4, -20, -100, -500, ...

$$r = \frac{-20}{-4} = 5 \quad a_n = a_{n-1} \cdot r$$

$$a_1 = -4$$

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

12. -2, -6, -18, -54, ...

$$r = \frac{-6}{-2} = 3 \quad a_n = a_{n-1} \cdot r$$

$$a_1 = -2$$

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

13. 1, 3, 9, 27, ...

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

$$a_1 = 1$$

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

14. 31104, -5184, 864, -144, ...

$$r = \frac{-5184}{31104} = -\frac{1}{6} \quad a_n = a_{n-1} \cdot r$$

$$a_1 = 31104$$

$$a_n = a_{n-1} \cdot -\frac{1}{6}$$

15. 0.2, -1, 5, -25, ...

$$r = \frac{-1}{0.2} = -5 \quad a_n = a_{n-1} \cdot r$$

$$a_1 = 0.2$$

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

16. -0.2, -1, -5, -25, ...

$$r = \frac{-1}{-0.2} = 5 \quad a_n = a_{n-1} \cdot r$$

$$a_1 = -0.2$$

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

17. 2, 10, 50, 250, ...

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

$$a_1 = 2$$

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

18.  $\frac{1}{2}, -\frac{1}{4}, \frac{1}{8}, -\frac{1}{16}, \dots$

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

$$a_1 = \frac{1}{2}$$

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

19. -64, -32, -16, -8, ...

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

$$a_1 = -64$$

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

20. 3, -18, 108, -648, ...

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

$$a_1 = 3$$

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