

Utilizing the Explicit Formula
Unit 7: Representations of Exponential Relations

For each of the following find the explicit formula and...

- A. Identify the next three terms
- B. Find the term named in the problem
- C. Find the 8th term.

<p>1. 0.25, 1, 4, 16, ... Find a_{11}</p> <p>$a_5 = 64$ $a_8 = 4096$</p> <p>$a_6 = 256$ $a_{11} = 262144$</p> <p>$a_7 = 1024$</p>	<p>2. 4, 8, 16, 32, ... Find a_{11}</p> <p>$a_5 = 64$ $a_8 = 512$</p> <p>$a_6 = 128$ $a_{11} = 4096$</p> <p>$a_7 = 256$</p>
<p>3. -3, 6, -12, 24, ... Find a_{12}</p> <p>$a_5 = -48$ $a_8 = 384$</p> <p>$a_6 = 96$ $a_{12} = 6144$</p> <p>$a_7 = -192$</p>	<p>4. -2, -6, -18, -54, ... Find a_{10}</p> <p>$a_5 = -162$ $a_8 = -4374$</p> <p>$a_6 = -486$ $a_{10} = -39366$</p> <p>$a_7 = -1458$</p>
<p>5. 0.5, 2, 8, 32, ... Find a_{11}</p> <p>$a_5 = 128$ $a_8 = 8192$</p> <p>$a_6 = 512$ $a_{11} = 524288$</p> <p>$a_7 = 2048$</p>	<p>6. 1.5, -3, 6, -12, ... Find a_9</p> <p>$a_5 = 24$ $a_8 = -192$</p> <p>$a_6 = -48$ $a_9 = 384$</p> <p>$a_7 = 96$</p>
<p>7. -0.5, -2, -8, -32, ... Find a_{11}</p> <p>$a_5 = -128$ $a_8 = -8192$</p> <p>$a_6 = -512$ $a_{11} = -524288$</p> <p>$a_7 = -2048$</p>	<p>8. $1, -\frac{1}{2}, \frac{1}{4}, -\frac{1}{8}, \dots$ Find a_9</p> <p>$a_5 = \frac{1}{16}$ $a_8 = -\frac{1}{128}$</p> <p>$a_6 = -\frac{1}{32}$ $a_9 = \frac{1}{256}$</p> <p>$a_7 = \frac{1}{64}$</p>
<p>9. 2, 8, 32, 128, ... Find a_{10}</p> <p>$a_5 = 512$ $a_8 = 32768$</p> <p>$a_6 = 2048$ $a_{10} = 524288$</p> <p>$a_7 = 8192$</p>	<p>10. $-5, -\frac{15}{4}, -\frac{45}{16}, -\frac{135}{64}, \dots$ Find a_9</p> <p>$a_5 = -\frac{405}{256}$ $a_8 = -\frac{16935}{16384}$</p> <p>$a_6 = -\frac{1215}{1024}$ $a_9 = -\frac{32805}{65536}$</p> <p>$a_7 = -\frac{3645}{4096}$</p>

11. 3, -6, 12, -24, ...

Find a_{11}

$$a_5 = 48$$

$$a_8 = -384$$

$$a_6 = -96$$

$$a_{11} = 3072$$

$$a_7 = 192$$

12. 3, -9, 27, -81, ...

Find a_{11}

$$a_5 = 243$$

$$a_8 = -6561$$

$$a_6 = -729$$

$$a_{11} = 177147$$

$$a_7 = 2187$$

13. $-5, \frac{5}{3}, -\frac{5}{9}, \frac{5}{27}, \dots$

Find a_{10}

$$a_5 = \frac{-5}{81}$$

$$a_8 = \frac{5}{2187}$$

$$a_6 = \frac{5}{243}$$

$$a_{10} = \frac{5}{19683}$$

$$a_7 = \frac{-5}{729}$$

14. $5, \frac{5}{2}, \frac{5}{4}, \frac{5}{8}, \dots$

Find a_{10}

$$a_5 = \frac{5}{16}$$

$$a_8 = \frac{5}{128}$$

$$a_6 = \frac{5}{32}$$

$$a_{10} = \frac{5}{512}$$

$$a_7 = \frac{5}{64}$$

15. $4, \frac{4}{3}, \frac{4}{9}, \frac{4}{27}, \dots$

Find a_{11}

$$a_5 = \frac{4}{81}$$

$$a_8 = \frac{4}{2187}$$

$$a_6 = \frac{4}{243}$$

$$a_{11} = \frac{4}{59049}$$

$$a_7 = \frac{4}{729}$$

16. 1.5, 3, 6, 12, ...

Find a_{12}

$$a_5 = 24$$

$$a_8 = 192$$

$$a_6 = 48$$

$$a_{12} = 3072$$

$$a_7 = 96$$

17. $1, \frac{1}{3}, \frac{1}{9}, \frac{1}{27}, \dots$

Find a_{12}

$$a_5 = \frac{1}{81}$$

$$a_8 = \frac{1}{2187}$$

$$a_6 = \frac{1}{243}$$

$$a_{12} = \frac{1}{177147}$$

$$a_7 = \frac{1}{729}$$

18. -2, 4, -8, 16, ...

Find a_{11}

$$a_5 = -32$$

$$a_8 = 256$$

$$a_6 = 64$$

$$a_{11} = -2048$$

$$a_7 = -128$$

19. -3, -12, -48, -192, ...

Find a_{10}

$$a_5 = -768$$

$$a_8 = -49152$$

$$a_6 = -3072$$

$$a_{10} = -786432$$

$$a_7 = -12288$$

20. -3, -6, -12, -24, ...

Find a_{11}

$$a_5 = -48$$

$$a_8 = -384$$

$$a_6 = -96$$

$$a_{11} = -3072$$

$$a_7 = -192$$

① 0.25, 1, 4, 16, ...

$$r = \frac{1}{0.25} = 4$$

(A) $a_5 = 16 \cdot 4 = \boxed{64}$

$$a_6 = 64 \cdot 4 = \boxed{256}$$

$$a_7 = 256 \cdot 4 = \boxed{1024}$$

(B) Explicit Formula

$$a_n = a_1 (r)^{n-1}$$

$$a_{11} = 0.25(4)^{11-1}$$

$$a_{11} = 0.25(4)^{10}$$

$$a_{11} = 0.25(1048576)$$

$$\boxed{a_{11} = 262144}$$

(C) $a_8 = 1024 \cdot 4$

$$\boxed{a_8 = 4096}$$

② 4, 8, 16, 32, ...

$$r = \frac{8}{4} = 2$$

(A) $a_5 = 32 \cdot 2 = \boxed{64}$

$$a_6 = 64 \cdot 2 = \boxed{128}$$

$$a_7 = 128 \cdot 2 = \boxed{256}$$

(B) Explicit Formula

$$a_n = a_1 (r)^{n-1}$$

$$a_{11} = 4(2)^{11-1}$$

$$a_{11} = 4(2)^{10}$$

$$a_{11} = 4(1024)$$

$$\boxed{a_{11} = 4096}$$

(C) $a_8 = 256 \cdot 2$

$$\boxed{a_8 = 512}$$

③ -3, 6, -12, 24, ...

$$r = \frac{6}{-3} = -2$$

(A) $a_5 = 24 \cdot -2 = \boxed{-48}$

$$a_6 = -48 \cdot -2 = \boxed{96}$$

$$a_7 = 96 \cdot -2 = \boxed{-192}$$

(B) Explicit Formula

$$a_n = a_1 (r)^{n-1}$$

$$a_{12} = -3(-2)^{12-1}$$

$$a_{12} = -3(-2)^{11}$$

$$a_{12} = -3(-2048)$$

$$\boxed{a_{12} = 6144}$$

(C) $a_8 = -192 \cdot -2$

$$\boxed{a_8 = 384}$$

④ $-2, -6, -18, -54, \dots$

$$r = \frac{-6}{-2} = 3$$

① $a_5 = -54 \cdot 3 = \boxed{-162}$

$$a_6 = -162 \cdot 3 = \boxed{-486}$$

$$a_7 = -486 \cdot 3 = \boxed{-1458}$$

② Explicit Formula

$$a_n = a_1 (r)^{n-1}$$

$$a_{10} = -2(3)^{10-1}$$

$$a_{10} = -2(3)^9$$

$$a_{10} = -2(19683)$$

$$\boxed{a_{10} = -39366}$$

③ $a_8 = -1458 \cdot 3$

$$\boxed{a_8 = -4374}$$

⑤ $0.5, 2, 8, 32, \dots$

$$r = \frac{2}{0.5} = 4$$

① $a_5 = 32 \cdot 4 = \boxed{128}$

$$a_6 = 128 \cdot 4 = \boxed{512}$$

$$a_7 = 512 \cdot 4 = \boxed{2048}$$

② Explicit Formula

$$a_n = a_1 (r)^{n-1}$$

$$a_{11} = 0.5(4)^{11-1}$$

$$a_{11} = 0.5(4)^{10}$$

$$a_{11} = 0.5(1048576)$$

$$\boxed{a_{11} = 524288}$$

③ $a_8 = 2048 \cdot 4$

$$\boxed{a_8 = 8192}$$

⑥ $1.5, -3, 6, -12, \dots$

$$r = \frac{-3}{1.5} = -2$$

① $a_5 = -12 \cdot -2 = \boxed{24}$

$$a_6 = 24 \cdot -2 = \boxed{-48}$$

$$a_7 = -48 \cdot -2 = \boxed{96}$$

② Explicit Formula

$$a_n = a_1 (r)^{n-1}$$

$$a_9 = 1.5(-2)^{9-1}$$

$$a_9 = 1.5(-2)^8$$

$$a_9 = 1.5(256)$$

$$\boxed{a_9 = 384}$$

③ $a_8 = -96 \cdot 2$

$$\boxed{a_8 = -192}$$

⑦ $-0.5, -2, -8, -32, \dots$

$$r = \frac{-2}{-0.5} = 4$$

(A) $a_5 = -32 \cdot 4 = \boxed{-128}$

$a_6 = -128 \cdot 4 = \boxed{-512}$

$a_7 = -512 \cdot 4 = \boxed{-2048}$

(B) Explicit Formula

$$a_n = a_1 (r)^{n-1}$$

$$a_{11} = -0.5 (4)^{11-1}$$

$$a_{11} = -0.5 (4)^{10}$$

$$a_{11} = -0.5 (1048576)$$

$$\boxed{a_{11} = -524288}$$

(C) $a_8 = -2048 \cdot 4$

$$\boxed{a_8 = -8192}$$

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

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

(A) $a_5 = \frac{1}{8} \cdot -\frac{1}{2} = \boxed{\frac{1}{16}}$

$a_6 = \frac{1}{16} \cdot -\frac{1}{2} = \boxed{-\frac{1}{32}}$

$a_7 = \frac{1}{32} \cdot -\frac{1}{2} = \boxed{\frac{1}{64}}$

(B) Explicit Formula

$$a_n = a_1 (r)^{n-1}$$

$$a_9 = 1 \left(-\frac{1}{2}\right)^{9-1}$$

$$a_9 = 1 \left(-\frac{1}{2}\right)^8$$

$$a_9 = 1 \left(\frac{1}{256}\right)$$

$$\boxed{a_9 = \frac{1}{256}}$$

(C) $a_8 = \frac{1}{64} \cdot -\frac{1}{2}$

$$\boxed{a_8 = -\frac{1}{128}}$$

⑨ $2, 8, 32, 128, \dots$

$$r = \frac{8}{2} = 4$$

(A) $a_5 = 128 \cdot 4 = \boxed{512}$

$a_6 = 512 \cdot 4 = \boxed{2048}$

$a_7 = 2048 \cdot 4 = \boxed{8192}$

(B) Explicit Formula

$$a_n = a_1 (r)^{n-1}$$

$$a_{10} = 2 (4)^{10-1}$$

$$a_{10} = 2 (4)^9$$

$$a_{10} = 2 (262144)$$

$$\boxed{a_{10} = 524288}$$

(C) $a_8 = 8192 \cdot 4$

$$\boxed{a_8 = 32768}$$

⑩ $-5, \frac{-15}{4}, \frac{-45}{16}, \frac{-135}{64}, \dots$

$$r = \frac{-15/4}{-5/1} = \frac{-15}{4} \cdot \frac{-1}{5} = \frac{15}{20} = \frac{3}{4}$$

(A) $a_5 = \frac{-135}{64} \cdot \frac{3}{4} = \boxed{\frac{-405}{256}}$

$$a_6 = \frac{-405}{256} \cdot \frac{3}{4} = \boxed{\frac{-1215}{1024}}$$

$$a_7 = \frac{-1215}{1024} \cdot \frac{3}{4} = \boxed{\frac{-3645}{4096}}$$

(B) Explicit Formula

$$a_n = a_1 (r)^{n-1}$$

$$a_9 = -5 \left(\frac{3}{4}\right)^{9-1}$$

$$a_9 = -5 \left(\frac{3}{4}\right)^8$$

$$a_9 = -5 \left(\frac{6561}{65536}\right)$$

$$a_9 = \boxed{\frac{-32805}{65536}}$$

(C) $a_8 = \frac{-3645}{4096} \cdot \frac{3}{4}$

$$a_8 = \boxed{\frac{-10935}{16384}}$$

⑪ $3, -6, 12, -24, \dots$

$$r = \frac{-6}{3} = -2$$

(A) $a_5 = -24 \cdot -2 = \boxed{48}$

$$a_6 = 48 \cdot -2 = \boxed{-96}$$

$$a_7 = -96 \cdot -2 = \boxed{192}$$

(B) Explicit Formula

$$a_n = a_1 (r)^{n-1}$$

$$a_{11} = 3(-2)^{11-1}$$

$$a_{11} = 3(-2)^{10}$$

$$a_{11} = 3(1024)$$

$$a_{11} = \boxed{3072}$$

(C) $a_8 = 192 \cdot -2$

$$a_8 = \boxed{-384}$$

⑫ $3, -9, 27, -81, \dots$

$$r = \frac{-9}{3} = -3$$

(A) $a_5 = -81 \cdot -3 = \boxed{243}$

$$a_6 = 243 \cdot -3 = \boxed{-729}$$

$$a_7 = -729 \cdot -3 = \boxed{2187}$$

(B) Explicit Formula

$$a_n = a_1 (r)^{n-1}$$

$$a_{11} = 3(-3)^{11-1}$$

$$a_{11} = 3(-3)^{10}$$

$$a_{11} = 3(59049)$$

$$a_{11} = \boxed{177147}$$

(C) $a_8 = 2187 \cdot -3$

$$a_8 = \boxed{-6561}$$

$$(13) -5, \frac{5}{3}, -\frac{5}{9}, \frac{5}{27}, \dots$$

$$r = \frac{\frac{5}{3}}{-5} = \frac{5}{3} \cdot -\frac{1}{5} = -\frac{1}{3}$$

$$(A) a_5 = \frac{5}{27} \cdot -\frac{1}{3} = \boxed{\frac{-5}{81}}$$

$$a_6 = \frac{-5}{81} \cdot -\frac{1}{3} = \boxed{\frac{5}{243}}$$

$$a_7 = \frac{5}{243} \cdot -\frac{1}{3} = \boxed{\frac{-5}{729}}$$

(B) Explicit Formula

$$a_n = a_1 (r)^{n-1}$$

$$a_{10} = -5 \left(-\frac{1}{3}\right)^{10-1}$$

$$a_{10} = -5 \left(-\frac{1}{3}\right)^9$$

$$a_{10} = -5 \left(\frac{-1}{19683}\right)$$

$$\boxed{a_{10} = \frac{5}{19683}}$$

$$(C) a_8 = \frac{-5}{729} \cdot -\frac{1}{3}$$

$$\boxed{a_8 = \frac{5}{2187}}$$

$$(14) 5, \frac{5}{2}, \frac{5}{4}, \frac{5}{8}, \dots$$

$$r = \frac{\frac{5}{2}}{5} = \frac{5}{2} \cdot \frac{1}{5} = \frac{1}{2}$$

$$(A) a_5 = \frac{5}{8} \cdot \frac{1}{2} = \boxed{\frac{5}{16}}$$

$$a_6 = \frac{5}{16} \cdot \frac{1}{2} = \boxed{\frac{5}{32}}$$

$$a_7 = \frac{5}{32} \cdot \frac{1}{2} = \boxed{\frac{5}{64}}$$

(B) Explicit Formula

$$a_n = a_1 (r)^{n-1}$$

$$a_{10} = 5 \left(\frac{1}{2}\right)^{10-1}$$

$$a_{10} = 5 \left(\frac{1}{2}\right)^9$$

$$a_{10} = 5 \left(\frac{1}{512}\right)$$

$$\boxed{a_{10} = \frac{5}{512}}$$

$$(C) a_8 = \frac{5}{64} \cdot \frac{1}{2}$$

$$\boxed{a_8 = \frac{5}{128}}$$

$$(15) 4, \frac{4}{3}, \frac{4}{9}, \frac{4}{27}, \dots$$

$$r = \frac{\frac{4}{3}}{4} = \frac{4}{3} \cdot \frac{1}{4} = \frac{1}{3}$$

$$(A) a_5 = \frac{4}{27} \cdot \frac{1}{3} = \boxed{\frac{4}{81}}$$

$$a_6 = \frac{4}{81} \cdot \frac{1}{3} = \boxed{\frac{4}{243}}$$

$$a_7 = \frac{4}{243} \cdot \frac{1}{3} = \boxed{\frac{4}{729}}$$

(B) Explicit Formula

$$a_n = a_1 (r)^{n-1}$$

$$a_{11} = 4 \left(\frac{1}{3}\right)^{11-1}$$

$$a_{11} = 4 \left(\frac{1}{3}\right)^{10}$$

$$a_{11} = 4 \left(\frac{1}{59049}\right)$$

$$\boxed{a_{11} = \frac{4}{59049}}$$

$$(C) a_8 = \frac{4}{729} \cdot \frac{1}{3}$$

$$\boxed{a_8 = \frac{4}{2187}}$$

⑩ 1.5, 3, 6, 12, ...

$$r = \frac{3}{1.5} = 2$$

① $a_5 = 12 \cdot 2 = \boxed{24}$

$a_6 = 24 \cdot 2 = \boxed{48}$

$a_7 = 48 \cdot 2 = \boxed{96}$

② Explicit Formula

$$a_n = a_1 (r)^{n-1}$$

$$a_{12} = 1.5(2)^{12-1}$$

$$a_{12} = 1.5(2)^{11}$$

$$a_{12} = 1.5(2048)$$

$$\boxed{a_{12} = 3072}$$

③ $a_8 = 96 \cdot 2$

$$\boxed{a_8 = 192}$$

⑪ $1, \frac{1}{3}, \frac{1}{9}, \frac{1}{27}, \dots$

$$r = \frac{\frac{1}{3}}{1} = \frac{1}{3}$$

① $a_5 = \frac{1}{27} \cdot \frac{1}{3} = \boxed{\frac{1}{81}}$

$a_6 = \frac{1}{81} \cdot \frac{1}{3} = \boxed{\frac{1}{243}}$

$a_7 = \frac{1}{243} \cdot \frac{1}{3} = \boxed{\frac{1}{729}}$

② Explicit Formula

$$a_n = a_1 (r)^{n-1}$$

$$a_{12} = 1\left(\frac{1}{3}\right)^{12-1}$$

$$a_{12} = 1\left(\frac{1}{3}\right)^{11}$$

$$a_{12} = 1\left(\frac{1}{177147}\right)$$

$$\boxed{a_{12} = \frac{1}{177147}}$$

③ $a_8 = \frac{1}{729} \cdot \frac{1}{3}$

$$\boxed{a_8 = \frac{1}{2187}}$$

⑫ $-2, 4, -8, 16, \dots$

$$r = \frac{4}{-2} = -2$$

① $a_5 = 16 \cdot -2 = \boxed{-32}$

$a_6 = -32 \cdot -2 = \boxed{64}$

$a_7 = 64 \cdot -2 = \boxed{-128}$

② Explicit Formula

$$a_n = a_1 (r)^{n-1}$$

$$a_{11} = -2(-2)^{11-1}$$

$$a_{11} = -2(-2)^{10}$$

$$a_{11} = -2(1024)$$

$$\boxed{a_{11} = -2048}$$

③ $a_8 = -128 \cdot -2$

$$\boxed{a_8 = 256}$$

$$(19) -3, -12, -48, -192, \dots$$

$$r = \frac{-12}{-3} = 4$$

$$(A) a_5 = -192 \cdot 4 = \boxed{-768}$$

$$a_6 = -768 \cdot 4 = \boxed{-3072}$$

$$a_7 = -3072 \cdot 4 = \boxed{-12288}$$

(B) Explicit Formula

$$a_n = a_1 (r)^{n-1}$$

$$a_{10} = -3(4)^{10-1}$$

$$a_{10} = -3(4)^9$$

$$a_{10} = -3(262144)$$

$$\boxed{a_{10} = -786432}$$

$$(C) a_8 = -12288 \cdot 4$$

$$\boxed{a_8 = -49152}$$

$$(20) -3, -6, -12, -24, \dots$$

$$r = \frac{-6}{-3} = 2$$

$$(A) a_5 = -24 \cdot 2 = \boxed{-48}$$

$$a_6 = -48 \cdot 2 = \boxed{-96}$$

$$a_7 = -96 \cdot 2 = \boxed{-192}$$

(B) Explicit Formula

$$a_n = a_1 (r)^{n-1}$$

$$a_{11} = -3(2)^{11-1}$$

$$a_{11} = -3(2)^{10}$$

$$a_{11} = -3(1024)$$

$$\boxed{a_{11} = -3072}$$

$$(C) a_8 = -192 \cdot 2$$

$$\boxed{a_8 = -384}$$

