

Find the requested term of the sequence given the RECURSIVE or EXPLICIT definitions.

- 1) Determine t_{12} , given that $t_1 = 2$ and $t_{n+1} = t_n + 4$

2		22 = t_6
Ans+4	2 = t_1	26 = t_7
	6 = t_2	30 = t_8
	10 = t_3	34 = t_9
	14 = t_4	38 = t_{10}
	18 = t_5	42 = t_{11}
		46 = t_{12}

$$t_{12} = 46$$

- 2) Determine a_8 , given that $a_1 = 1$ and $a_n = 2 \cdot a_{n-1} + 1$

2		95 = a_6
2*Ans+1	2 = a_1	191 = a_7
	5 = a_2	383 = a_8
	11 = a_3	767 = a_9
	23 = a_4	1535 = a_{10}
	47 = a_5	3071 = a_{11}
		6143 = a_{12}

$$a_8 = 383$$

- 3) Determine t_{21} , given that $t_1 = 25$ and $t_n = 3 \cdot n^2 - 50$

$$n=21: t_{21} = 3 \cdot (21)^2 - 50$$

$$= 1273$$

$$3(21)^2 - 50$$

$$1273$$

$$t_{21} = 1273$$

- 4) Determine a_{14} , given that $a_1 = 1$ and $a_n = 2^n - n$

$$n=14: a_{14} = 2^{14} - 14$$

$$= 16370$$

$$2^{14} - 14$$

$$16370$$

$$a_{14} = 16,370$$

Find the requested term number of the sequence given the RECURSIVE or EXPLICIT definitions.

- 5) Given that $t_1 = 5$ and $t_{n+1} = 2 \cdot t_n - 3$, determine which term of the sequence is 515.

5		67 = t_6
2*Ans-3	5 = t_1	131 = t_7
	7 = t_2	259 = t_8
	11 = t_3	515 = t_9
	19 = t_4	1027
	35 = t_5	2051
		4099

515 IS THE 9TH TERM

- 6) Given that $a_1 = 1$ and $a_n = 6 \cdot n - 5$, determine which term of the sequence is 241.

$$241 = 6n - 5$$

$$+5 \quad +5$$

$$246 = 6n$$

$$\frac{246}{6} = \frac{6n}{6}$$

$$41 = n$$

241 IS THE 41ST TERM

Find the RECURSIVE & EXPLICIT definitions and then find the requested term

7) 3, 5, 7, 9, 11, ...

ARITHMETIC
SEQUENCE

Find $a_{42} = \underline{85}$
 $= 3 + 41(2) = 85$

Recursive: $a_{n+1} = a_n + 2$

Explicit: $a_n = 3 + (n-1)2$

$$\begin{aligned} a_1 &= 3+0(2) = 3 \\ a_2 &= 3+1(2) = 5 \\ a_3 &= 3+2(2) = 7 \\ a_4 &= 3+3(2) = 9 \\ a_5 &= 3+4(2) = 11 \\ a_6 &= 3+5(2) = 13 \end{aligned}$$

8) 5, 8, 11, 14, ...

ARITHMETIC
SEQUENCE

Find $a_{33} = \underline{101}$
 $= 5 + 32(3)$
 $= 101$

Recursive: $a_{n+1} = a_n + 3$

Explicit: $a_n = 5 + (n-1)3$

$$\begin{aligned} a_1 &= 5+0(3) = 5 \\ a_2 &= 5+1(3) = 8 \\ a_3 &= 5+2(3) = 11 \\ a_4 &= 5+3(3) = 14 \\ a_5 &= 5+4(3) = 17 \end{aligned}$$

9) 4, 12, 36, 108, ...

GEOMETRIC SEQUENCE

Find $a_{21} \approx \underline{1.39 \times 10^{10}}$
 $= 4 \cdot 3^{20}$

Recursive: $a_{n+1} = 3 \cdot a_n$

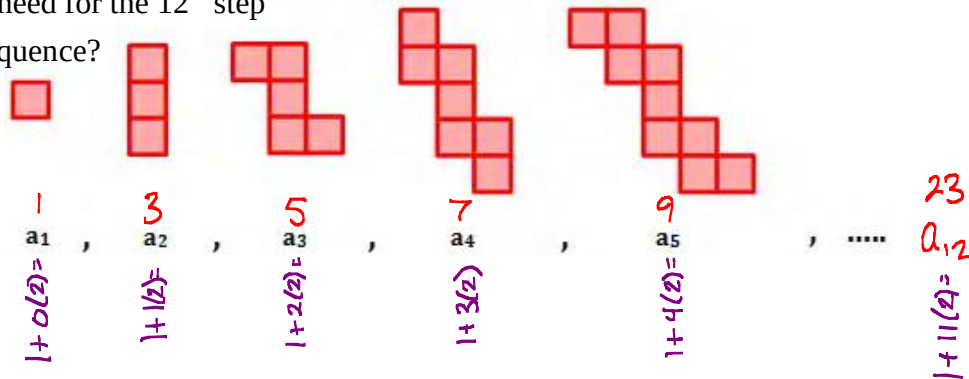
Explicit: $a_n = 4 \cdot 3^{n-1}$

$$\begin{aligned} a_1 &= 4 \cdot 3^0 = 4 \\ a_2 &= 4 \cdot 3^1 = 12 \\ a_3 &= 4 \cdot 3^2 = 36 \\ a_4 &= 4 \cdot 3^3 = 108 \\ a_5 &= 4 \cdot 3^4 = 324 \end{aligned}$$

$$\begin{aligned} 4 \cdot 3^{20} \\ = 1.39471376 \times 10^{10} \end{aligned}$$

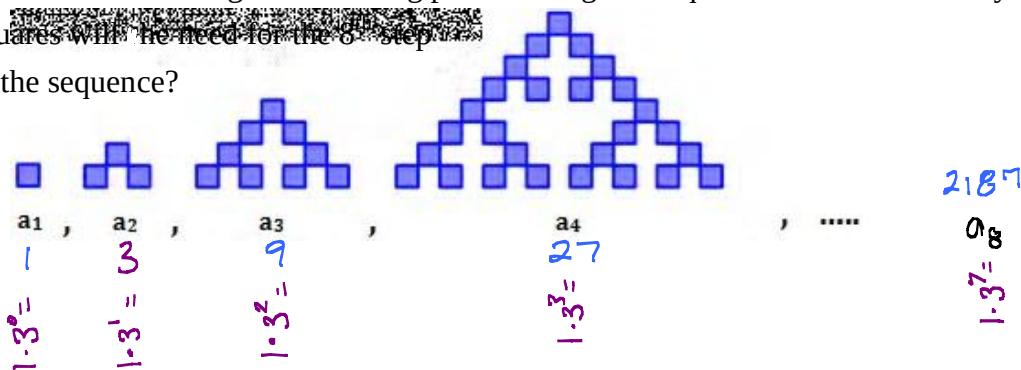
Answer the following about the pattern sequences.

- 10) Jessie started creating the following pattern using red square blocks. How many red squares will she need for the 12th step of the sequence?



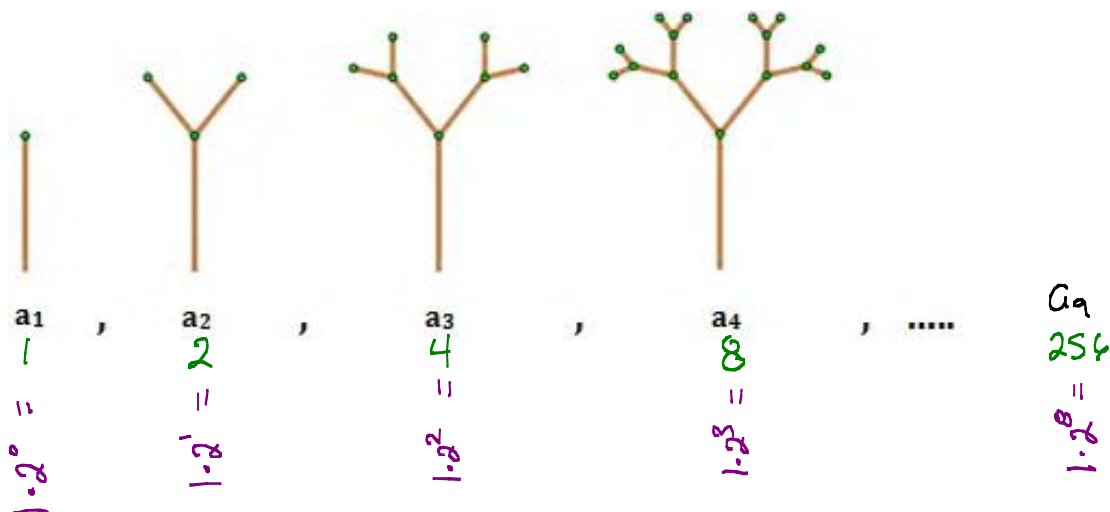
RECURSIVE DEFINITION: $a_{n+1} = a_n + 2$
 EXPLICIT DEFINITION $a_n = 1 + (n-1)2$

- 11) Ethan started creating the following pattern using blue square blocks. How many blue squares will he need for the 8th step of the sequence?



RECURSIVE DEFINITION: $a_{n+1} = 3 \cdot a_n$
 EXPLICIT DEFINITION $a_n = 1 \cdot 3^{n-1}$

- 11) Ashley started drawing several iterations of a binary tree. In each iterative step, the number of new leaves is doubled. How many new leaves will there be on the 9th step of the sequence?



RECURSIVE DEFINITION: $a_{n+1} = 2 \cdot a_n$
 EXPLICIT DEFINITION $a_n = 1 \cdot 2^{n-1}$