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

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

\[
\begin{align*}
\text{Ans} + 4 & \quad 2 \times t_1 \\
5 & \quad = t_2 \\
10 & \quad = t_3 \\
14 & \quad = t_4 \\
18 & \quad = t_5
\end{align*}
\]

\(t_{12} = 46\)

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

\[
\begin{align*}
2 & \quad = a_1 \\
2 \times \text{Ans} + 1 & \quad = 16 \\
5 & \quad = a_2 \\
11 & \quad = a_3 \\
23 & \quad = a_4 \\
47 & \quad = a_5
\end{align*}
\]

\(a_8 = 382\)

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

\[
\begin{align*}
\text{N} = 21 & \quad t_{21} = 3 \cdot (21)^2 - 50 \\
& \quad = 1273
\end{align*}
\]

\(t_{21} = 1273\)

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

\[
\begin{align*}
2^{14} & \quad = a_{14} \\
16370 & \quad = a_{14}
\end{align*}
\]

\(a_{14} = 16370\)

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.

\[
\begin{align*}
5 & \quad = t_1 \\
2 \times \text{Ans} - 3 & \quad = 131 \\
7 & \quad = t_2 \\
19 & \quad = t_3 \\
35 & \quad = t_4 \\
67 & \quad = t_5
\end{align*}
\]

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.

\[
\begin{align*}
\frac{241 = 6n - 5 \quad +5 \quad + 5}{\frac{246 = 6n}{6}} \quad \frac{41 = n}
\end{align*}
\]

241 is the 41st term
Find the RECURSIVE & EXPLICIT definitions and then find the requested term

7) \(3, 5, 7, 9, 11, \ldots\)

- **Recursive:**
  \[a_{n+1} = a_n + 2\]

- **Explicit:**
  \[a_n = 3 + (n-1)2\]

8) \(5, 8, 11, 14, \ldots\)

- **Recursive:**
  \[a_{n+1} = a_n + 3\]

- **Explicit:**
  \[a_n = 5 + (n-1)3\]

9) \(4, 12, 36, 108, \ldots\)

- **Recursive:**
  \[a_{n+1} = 3a_n\]

- **Explicit:**
  \[a_n = 4 \cdot 3^{n-1}\]
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 12\textsuperscript{th} step of the sequence?

\begin{align*}
&\text{Recursive Definition: } a_{n+1} = a_n + 2 \\
&\text{Explicit Definition: } a_n = 1 + (n-1)2
\end{align*}

11) Ethan started creating the following pattern using blue square blocks. How many blue squares will she need for the 8\textsuperscript{th} step of the sequence?

\begin{align*}
&\text{Recursive Definition: } a_{n+1} = 3 \cdot a_n \\
&\text{Explicit Definition: } a_n = 1 \cdot 3^{n-1}
\end{align*}

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 9\textsuperscript{th} step of the sequence?

\begin{align*}
&\text{Recursive Definition: } a_{n+1} = 2 \cdot a_n \\
&\text{Explicit Definition: } a_n = 1 \cdot 2^{n-1}
\end{align*}