

Sequence of positive integers solution:

Construct a table and see if there is a pattern:

n	$2x_{n-1} - x_{n-2}$	$x_n =$ Composite $> 2x_{n-1} - x_{n-2}$	pattern
1	-	4	
2	-	6	
3	8	9	9
4	12	14	9 + 5
5	19	20	9 + 5 + 6
6	26	27	9 + 5 + 6 + 7
7	34	35	9 + 5 + 6 + 7 + 8
8	43	44	9 + 5 + 6 + 7 + 8 + 9
9	53	54	9 + 5 + 6 + 7 + 8 + 9 + 10
10	64	65	9 + 5 + 6 + 7 + 8 + 9 + 10 + 11
			...etc.

The pattern, for $n > 3$, is $x_n = 9 + \sum_{k=5}^{n+1} k = 9 + \sum_{k=1}^{n+1} k - \sum_{k=1}^4 k$,

Or
$$x_n = 9 + \frac{(n+1)(n+2)}{2} - \frac{4 \times 5}{2} = \frac{(n+1)(n+2)}{2} - 1$$

Therefore,
$$x_{2007} = \frac{(2008)(2009)}{2} - 1 = 2017035$$