

Question 1. -11

Question 2. The form of the answer is $A2^n + Bn2^n + C4^n$. If you have an answer of this form, and if it matches the initial conditions $(1, 6, 24)$, then it is correct.

Question 3. This should be $\frac{5^k + 3^k - 2}{8}$ if k is even, and a similar but different result if k is odd.

Question 4. The answer is very simple, and if your formula gives $a_0 = 1$ and $a_1 = 6$ then it is bound to be right.

The calculations will be simplified if you take $a_0 = 1$ (“backing up” the recurrence)

Question 5. Inspection of the sequence gives for the first few values 1, 2, 3, 5, and suggests some version of the Fibonacci sequence.

This gives a fair guess as to what the recurrence should be: your job is to prove it. (Hint: as usual, consider whether the last element of the set is taken or not.)