Question 1

Express $\sqrt{63} + \sqrt{7} + \sqrt{175}$ in the form $k\sqrt{7}$, where k is an integer.

Question 2

Find the nth term of this quadratic sequence:
$-9, \ -21, \ -37, \ -57, \ -81, \dots$

Question 1

Express $\sqrt{63} + \sqrt{7} + \sqrt{175}$ in the form $k\sqrt{7}$, where k is an integer.

$$\sqrt{63} + \sqrt{7} + \sqrt{175}$$

$$= 3\sqrt{7} + \sqrt{7} + 5\sqrt{7}$$

$$= 9\sqrt{7}$$

Question 2

Find the nth term of this quadratic sequence:
$-9, \ -21, \ -37, \ -57, \ -81, \ldots$

The first differences are: $-12, \ -16, \ -20, \ -24$
The second differences are: -4, which means the sequence
has nth term $-2n^2 + bn + c$

So $-2n^2 + bn + c$: $-9, \ -21, \ -37, \ -57, \ -81, \ldots$
And $-2n^2$ $\qquad$: $\ -2, \ -8, \ -18, \ -32, \ -50, \ldots$

i.e. $\qquad bn + c$: $-7, \ -13, \ -19, \ -25, \ -31, ..$

so $b = -6$ and $c = -1$

So the nth term of the quadratic sequence is $-2n^2 - 6n - 1$