SEQUENCES (QUADRATIC + OTHER)

CONTENTS

Worked example	Your turn
Generate the first 5 terms of the sequence with n^{th} term: $2n^2 - 3n + 1$:	Generate the first 5 terms of the sequence with n^{th} term: $3n^2 + 4n - 2$: $5, 18, 37, 62, 93$

Worked example	Your turn
Find the n^{th} term: $1, 4, 9, 16, \ldots$	Find the n^{th} term: $1, 8, 27, 64, \ldots$ n^3
$0, 3, 8, 15, \ldots$	$-1, 6, 25, 62, \ldots$ $n^3 - 2$
$3, 6, 11, 18, \ldots$	$4, 11, 30, 67, \ldots$ $n^3 + 3$

Worked example	Your turn
Find the n^{th} term: $4, 10, 20, 34, \ldots$ $2, 5, 14, 29, \ldots$	Find the n^{th} term: $2, 5, 16, 35, \ldots$ $4n^2 - 9n + 7$

Worked example	Your turn
Find the n^{th} term: $8, 4, -6, -22, -44, \ldots$ $12, 11, 6, -3, -16 \ldots$	Find the n^{th} term: $6, 5, 0, -9, -22, \ldots$ $-2n^2 + 5n + 3$

Worked example	Your turn
Generate the first 5 terms of the sequence with n^{th} term:	Generate the first 5 terms of the sequence with n^{th} term:
2^n:	4^n: $4, 16, 64, 256, 1024$
2×3^n:	4×5^n: $20, 100, 500, 2500, 12500$
$3 \times 4^{n-1}$:	$5 \times 6^{n-1}$: $5, 30, 180, 1080, 6480$

Worked example	Your turn
Generate the first 5 terms of the sequence with n^{th} term: $2^n - n^2$:	Generate the first 5 terms of the sequence with n^{th} term: $3^n - n^3$: $2, 1, 0, 17, 118$

Worked example	Your turn
Find the n^{th} term:	Find the n^{th} term:
$2, 4, 8, 16 \ldots$	$3, 9, 27, 81 \ldots$
	3^n
$6, 18, 54, 162 \ldots$	$6, 12, 24, 48 \ldots$
	3×2^n
$2, 6, 18, 54 \ldots$	$3, 6, 12, 24 \ldots$
	$3 \times 2^{n-1}$

Worked example	Your turn
$3, 6, 12, 24 \ldots$	$4, 12, 36, 108 \ldots$
The next 3 terms:	The next 3 terms: $324, 972, 2916$
The n^{th} term:	The n^{th} term: $4 \times 3^{n-1}$
The 10^{th} term:	The 10^{th} term: 78732

Worked example	Your turn
Find the next three terms of: $1, 1, 2, 3, 5, \ldots$ $5, -3, 2, -1, 1, \ldots$	Find the next three terms of: $2, 5, 7, 12, 19, \ldots$ $31, 50, 81$

Worked example	Your turn
Find the next three terms of: $1, 3, 6, 10, 15, \ldots$	Find the next three terms of: $1, 5, 10, 16, 23, \ldots$ $31, 40, 50$

Worked example	Your turn
$x_1 = 3, x_{n+1} = x_n + 2$ Find the first four terms of the sequence:	$x_1 = 5, x_{n+1} = x_n - 3$ Find the first four terms of the sequence: $5, 2, -1, -4$

Worked example	Your turn
Starting with $x_0 = 1$, use the iteration formula $x_{n+1} = \sqrt{x_n + 1}$ three times, to find an estimate for the solution of $x^2 - x - 1 = 0$. Write down all the digits on your calculator display.	Starting with $x_0 = 0$, use the iteration formula $x_{n+1} = \frac{1}{4} - \frac{(x_n)^3}{4}$ two times, to find an estimate for the solution of $x^3 + 4x = 1$. Write down all the digits on your calculator display. $x_1 = 0.25$ $x_2 = 0.24609375$

Worked example	Your turn
Show that $2x^2 - 5x + 1 = 0$ can be written in the form $x = \sqrt{\frac{5x-1}{2}}$	Show that $x^2 - x - 19 = 0$ can be written in the form $x = \sqrt{19 + x}$ $x^2 = 19 + x$ $x = \sqrt{19 + x}$
Use the iteration formula $x_{n+1} = \sqrt{\frac{5x_n-1}{2}}$, to find x_4 to 3 decimal places. Start with $x_0 = 2$	Use the iteration formula $x_{n+1} = \sqrt{19 + x_n}$ to find x_4 to 3 decimal places. Start with $x_0 = 0$ $x_4 = 4.89$ (3 dp)