



Air maths tuition

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## Sequences - Recurrence relationships

$6, 13, 27, 55, \dots$	Find the first 4 terms in the sequence
$u_1 = 6$	$u_{n+2} = 2u_{n+1} - u_n, u_1 = 3, u_2 = -1, n \geq 1$
$u_2 = 13$	when $n=1$ : when $n=2$
$u_3 = 27$	$u_3 = 2u_2 - u_1$ : $u_4 = 2u_3 - u_2$
$u_4 = 55$	$= 2(-1) - 3$ : $= 2(-5) - (-1)$
$u_{n+1} = 2u_n + 1$	$= -5$ : $= -9$
where $u_1 = 6$	$\therefore$ Sequence is $3, -1, -5, -9$
and $n \geq 1$	Find the first 4 terms in the sequence
	$u_{n+2} = u_{n+1}^2 - 2u_n, u_1 = 2, u_2 = 5, n \geq 1$
Find the first 3 terms in the sequence	when $n=1$ : when $n=2$
$u_{n+1} = 3u_n^2 - 9, u_1 = 2, n \geq 1$	$u_3 = u_2^2 - 2u_1$ : $u_4 = u_3^2 - 2u_2$
when $n=1$ : when $n=2$	$= 5^2 - 2(2)$ : $= 21^2 - 2(5)$
$u_2 = 3u_1^2 - 9$ : $u_3 = 3u_2^2 - 9$	$= 21$ : $= 431$
$= 3(2)^2 - 9$ : $= 3(3)^2 - 9$	sequence is $2, 5, 21, 431$ ✓
$= 3$ : $= 18$	
$\therefore$ sequence is $2, 3, 18$	

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