Recurrence Relation Example

Given the recurrence relation

$a(n) = a(n-1) + 4$

where

$a(1) = 0$

write down the relation in closed form.

Step 1 - Write down a2 given that a(1) = 0

$a1 = 0$

$a2 = 4$ given by $a(n) = a1 + 4 = 4$

$a3 = 8$ given by $a(n) = a2 + 4 = 8$

$a4 = 12$ given by $a(n) = a3 + 4 = 12$

$a5 = 16$ given by $a(n) = a4 + 4 = 16$

$a6 = 20$ given by $a(n) = a5 + 4 = 20$

we could do more but we should be able to spot a pattern by now, **progression is +4**

Step 2 - Write down the closed form

To do this we can write out a table as follows:

a(n)=	0	4	8	12	16	20
n=	1	2 usn	3	4	5	6

So when n = 1 a(n) = 0

when n = 2 a(n) = 4

So for example when n = 4

a(n) = 4(n-1)

$= 4(4-1)$

$= 4(3)$

$= 12$

Therefore, closed form is equal to

a(n) = 4(n-1)