

Recurrence Relations – basics

1. A recurrence relation is defined as

$$u_{n+1} = 2u_n + 10, u_0 = 20$$

(a) Find the values of u_1 and u_2 .
(b) Find the smallest value of n such that $u_n > 500$.

2. A recurrence relation is defined as

$$u_{n+1} = 0.5u_n + 6, u_0 = 8$$

Find the values of u_1 , u_2 and u_3

3. A recurrence relation is defined as

$$u_n = 3u_{n-1} + 1.5, u_1 = 30$$

(a) Find the values of u_2 and u_3
(b) Find the smallest value of n such that $u_n > 1000$.

4. A recurrence relation is defined as

$$u_n = 0.25u_{n-1} - 4, u_1 = 10$$

(a) Find the values of u_2 and u_3
(b) Find the smallest value of n such that $u_n < -5.3$.

5. A recurrence relation is defined as

$$u_n = 4u_{n-1} + 8, u_1 = 88$$

Find the values of u_0 and u_2

6. A recurrence relation is defined as

$$u_{n+1} = 0.4u_n + 2, u_2 = 6$$

(a) Find the values of u_3 and u_4

(b) Find the values of u_1 and u_0

7. A recurrence relation is defined as

$$u_{n+1} = 2u_n + 40, u_6 = 240$$

(a) Find the value of u_7

(b) Find the values of u_5 and u_4

8. A recurrence relation is defined as

$$u_{n+2} = 5u_{n+1} + 2, u_3 = 212$$

(a) Find the values of u_4 and u_5

(b) Find the values of u_2 and u_1

(c) Find the smallest value of n such that $u_n > 30\ 000$.

9. A recurrence relation is defined as

$$u_{n+1} = 2u_n + 5, u_1 = 55$$

(a) Find the values of u_2 and u_3

(b) How many terms of this sequence lie between 1000 and 10 000.

10. A recurrence relation is defined by

$$u_{n+1} = pu_n + 2, u_0 = p$$

(a) Find an expression for u_1

(b) Given $u_1 = 6$, find **two** values for p .

11. A recurrence relation is defined by

$$u_{n+1} = ku_n - 4, u_0 = 2$$

(a) Find expressions for u_1 and u_2 in terms of k .

(b) Given $u_2 = 2$, find the value of k if $k > 0$.

12. A recurrence relation is defined by

$$u_n = mu_{n-1} + 1, u_1 = 3$$

(a) Find expressions for u_2 and u_3 in terms of m .

(b) If $u_3 = 3$, find m .