

## Essential Skills 15

The skills in this series of worksheets appear frequently.

These are the GIFTS you must take to succeed



### Limit of a Recurrence Relation

Find the value of the limit, where one exists:

1.  $U_{n+1} = 0 \cdot 2U_n + 4$

2.  $U_{n+1} = \frac{1}{3}U_n - 6$

3.  $U_{n+1} = 1 \cdot 5U_n - 2$

4.  $U_{n+1} = 0 \cdot 9U_n + 1$

5.  $U_{n+1} = 0 \cdot 3U_n + 2$

6.  $U_{n+1} = U_n - 3$

7.  $U_{n+1} = 9 - \frac{1}{2}U_n$

8.  $U_{n+1} = 42 - 0 \cdot 4U_n$

9.  $U_{n+1} = 0 \cdot 6U_n + 3 \cdot 6$

10.  $U_{n+1} = \frac{1}{6}U_n - \frac{5}{2}$

### APPLYING QUESTION



A patient is given a 180mg dose of medication.

The levels in the bloodstream will decrease by 40% each hour.

To compensate, a new dose of 100mg is given hourly.



- How many doses will it take to consistently stay above 130mg?
- A recurrence relation in the form  $U_{n+1} = aU_n + b$  can be used to model this course of treatment.  
Write down values for a and b.
- It is known that more than 260mg in the bloodstream results in serious side effects.  
Is it safe to continue this course of treatment?