Section 7.1 Introduction to Recurrence Relations

2. Given the sequence 3, 6, 9, 15, 24, 39, … notice that each number is the sum of the previous two entries. This means we will have two initial values and the sequence can be defined as follows: $a_n = a_{n-1} + a_{n-2}$ for n ≥ 3
$a_1 = 3 \quad a_2 = 6$

9. The recurrence relation is $A_n = (1.1)A_{n-1}$

10. The initial condition: $A_0 = 2000$.

11. $A_1 = 2200$; $A_2 = 2420$; $A_3 = 2662$.

12. $A_n = 2000\,(1.1)^n$

33. See back of the book for the n = 3 case. The n = 4 case is very similar.

59. The problem with the proof as given in the book is that the recurrence relation is defined for n ≥ 3 This means that the basis step would be n = 3, not n = 1 as given in the book. And if you check the real basis step, you will immediately see that the sequence is not equal to 1 for every n ≥ 1.

Section 7.2 Solving Recurrence Relations

2. Not linear homogeneous (extra factor of n)

5. and 8. This ones are linear homogeneous.

16. $a_n = 3 \cdot 2^n + 2 \cdot 5^n$

17. $a_n = 3 \cdot 4^n + 1 \cdot (-2)^n = 3 \cdot 4^n + (-2)^n$

22. $a_n = 2 \cdot \left(\frac{1}{3}\right)^n + 9 \cdot n \cdot \left(\frac{1}{3}\right)^n$

34. $a_n = \left(\frac{2}{3} \cdot 2^n + \frac{1}{3} \cdot (-1)^n\right)^2$