Soluciones a los ejercicios III

1. a) $a_n = c\,(1{,}5)^n$, $n \geq 0$; b) $a_n = c\,(5/4)^n$, $n \geq 0$;
c) $a_n = (15/4)\,(4/3)^n$, $n \geq 0$ d) $a_n = 16\,(3/2)^n$, $n \geq 0$.

2. $d = 3/7$.

3. 2.200 €.

4. 145; 45.

5. a) $a_n = (4/7)\,6^n + (3/7)\,(-1)^n$, $n \geq 0$; b) $a_n = (-2)\,5^n + 4\,(1/2)^n$, $n \geq 0$;
c) $a_n = 4 + 3\,(-1/3)^n$, $n \geq 0$; d) $a_n = 3\,\text{sen}\,(n\pi/2)$, $n \geq 0$;
e) $a_n = 2^n\,(\cos\,(n\pi/2) + (1/2)\,\text{sen}\,(n\pi/2))$, $n \geq 0$; f) $a_n = 3^n\,(5 - n)$, $n \geq 0$;
g) $a_n = (2)^{n/2}\,(\cos\,(3n\pi/4) + 4\,\text{sen}\,(3n\pi/4))$, $n \geq 0$;

6. $a_n = (7^n - (-3)^n)/10$.

7. $a_n = F_{n+1}$; $n \geq 1$.

8. $a_n = F_{n+1}$; $n \geq 0$.

9. $a_n = \left(\dfrac{5+\sqrt{21}}{2\sqrt{21}}\right)\left(\dfrac{3+\sqrt{21}}{2}\right)^n - \left(\dfrac{5-\sqrt{21}}{2\sqrt{21}}\right)\left(\dfrac{3-\sqrt{21}}{2}\right)^n$.

10. $a_n = \left(\dfrac{8+9\sqrt{2}}{16}\right)(2+4\sqrt{2}\,)^n + \left(\dfrac{8-9\sqrt{2}}{16}\right)(2-4\sqrt{2}\,)^n$

11. $a_n = F_{n-1}$; $n \geq 1$.

12. a) $a_n = (51\,4^n - 35)^{1/2}$; $n \geq 0$; b) $a_n = (1/9)\,((-1)^n - 2^{n+1})^2$; $n \geq 0$;
c) $a_0 = 10$, $a_n = (2/3n)\,(2^n - (-1)^n)$; $n \geq 1$; d) $a_n = 2^{(5/2)\,(1/3)^n + (1/2)}$
e) $a_n = \exp_2(r^{n-1}\,\text{sen}(n\theta)/\text{sen}\,\theta)$, siendo $r = \sqrt{2}$ y $\theta = 1{,}3931$ radianes.

13. $F_{n+2} = F_{n+1} + F_n$; $n \geq 0$. Por tanto m.c.d. (F_{n+2}, F_{n+1}) = m.c.d. (F_{n+1}, F_n); $n \geq 0$.

14. a) $a_n = (n+1)^2$, $n \geq 0$; b) $a_n = 3 + n\,(n-1)^2$, $n \geq 0$;
c) $a_n = 6\,2^n - 5$, $n \geq 0$; d) $a_n = n!$ si n es par, 0 en otro caso;
e) $a_n = 2^n + n\,2^{n-1}$, $n \geq 0$.

15. 11.890,056 €.

16. $a_n = (1/2)\,(7\,n^2 + 17\,n - 36)\,3^{n-2} + 3\,2^n$.

17. a) $a_n = (3^n + 1)/2$, $n \geq 0$; b) $a_n = 1 + (n\,(n-1)\,(2n-1))/6$, $n \geq 0$;
c) $a_n = (3^n + 5^n)/2$, $n \geq 0$; d) $a_n = 5\,2^n - 4$, $n \geq 0$;
e) $a_n = 2^n$, $n \geq 0$.

18. a) $a_n = 2^n\,(1 - 2n)$, $b_n = n\,2^{n+1}$, $n \geq 0$;
b) $a_n = (3^n + 2\,n - 1)/4$, $b_n = (5 + 2\,n - 3^n)/4$, $n \geq 0$;