

TEMA 6: RENTAS VARIABLES

EJERCICIO 1

n = 4 años
A = 4.000 €
A = 4.000 €
A = 5.000 €
A 5.000 €
i = 0,04 anual

$$V_o = 4.000 \frac{1}{(1,04)^1} + 4.000 \frac{1}{(1,04)^2} + 5.000 \frac{1}{(1,04)^3} + 5.000 \frac{1}{(1,04)^4}$$

$$V_o = 3.846,15 + 3.698,22 + 4.444,98 + 4.274,02$$

$$V_o = 16.263,37 \text{ €}$$

$$V_n = 4.000 (1,04)^3 + 4.000 (1,04)^2 + 4.000 (1,04) + 4.000$$

$$V_n = 4.499,46 + 4.326,40 + 5.200 + 5.000$$

$$V_n = 19.025,86 \text{ €}$$

EJERCICIO 2

A = 4.000 €
A = 4.200 €
A = 4.500 €
A = 5.300 €
i = 0,04 anual

$$V_o = 4.000 \frac{1}{(1,04)^1} + 4.200 \frac{1}{(1,04)^2} + 4.500 \frac{1}{(1,04)^3} + 5.300 \frac{1}{(1,04)^4}$$

$$V_o = 3.846,15 + 3.883,14 + 4.000,48 + 4.530,46$$

$$V_o = 16.260,23 \text{ €}$$

$$V_n = 4.000 (1,04)^3 + 4.200 (1,04)^2 + 4.500 (1,04) + 5.300$$

$$V_n = 4.499,46 + 4.542,72 + 4.680 + 5.300$$

$$V_n = 19.022,18 \text{ €}$$

EJERCICIO 3

N = 8
A = 6.000 €
q = 1,05
i = 0,06 anual

$$V_o (p.g.) = a_1 \times \frac{1 - q^n \times V^n}{1 + i - q}$$

$$V_o (p.g.) = 6.000 \times \frac{1 - 1,05^8 \times V^8}{1 + 0,06 - 1,05}$$

$$V_o (p.g.) = 6.000 \times \frac{1 - 1,477455 \times 0,627412}{0,01}$$

$$V_o (p.g.) = 43.816,20 \text{ €}$$

EJERCICIO 4

n = 5 años
A = 12.500 €
q = 1,04
i = 0,05 anual

$$V_o (p.g.) = a_1 \times \frac{1 - q^n \times V^n}{1 + i - q}$$

$$V_o (p.g.) = 12.500 \times \frac{1 - 1,04^5 \times V^5}{1 + 0,05 - 1,04}$$

$$V_o (p.g.) = 12.500 \times \frac{1 - 1,216653 \times 0,783526}{0,01}$$

$$V_o (p.g.) = 58.400,93 \text{ €}$$

EJERCICIO 5

$V_o (p.g.) = 1.470.948,25$
A = 50.000 €
q = 1,188
i = 0,08 anual
n = X

$$V_o (p.g.) = a_1 \times \frac{1 - q^n \times V^n}{1 + i - q}$$

$$1.470.948,25 = 50.000 \times \frac{1 - 1,188^n \times V^n}{1 + 0,08 - 1,188}$$

$$1.470.948,25 = 50.000 \times \frac{1 - (1,188)^n \times (1,08)^{-n}}{-0,108}$$

$$1.470.948,25 \times (-0,108) = 50.000 \times \frac{(1,188)^n}{(1,08)^n}$$

$$-158.862,411 = 50.000 \times \frac{(1,188)^n}{(1,08)^n}$$

$$\frac{-158.862,411}{50.000} = \frac{(1,188)^n}{(1,08)^n}$$

$$-3,177248 - 1 = - \frac{(1,188)^n}{(1,08)^n}$$

$$-4,177248 = - \frac{(1,188)^n}{(1,08)^n}$$

$$\log 4,177248 = n \times \log 1,188 - n \times \log 1,08$$

$$0,620890 = n \times 0,074816 - n \times 0,033423$$

$$0,620890 = n (0,074816 - 0,033423)$$

$$0,620890 = n \times 0,041393$$

$$n = 15 \text{ años}$$

EJERCICIO 6	
$P_o(p.g.) = X$ $A = 5.558 \text{ €}$ $q = 1,04$ $i = 0,06$	$P_o(p.g.) = a_1 \times \frac{1}{1 + i - q} \times (1+i)$ $P_o(p.g.) = 5.558 \times \frac{1}{1 + 0,06 - 1,04} \times (1,06)$ $P_o(p.g.) = 5.558 \times \frac{1}{0,02} \times (1,06)$ $P_o(p.g.) = 294.574 \text{ €}$
EJERCICIO 7	
$i = 0,05$ anual $n = 6$ términos $q = 1,05$ $V_n(p.g.) = 25.000 \text{ €}$	$q = (1+i)$ $V_n(p.g.) = a_1 \times n \times (1+i)^{n-1}$ $25.000 = A_1 \times 6 \times (1,05)^5$ $25.000 = A_1 \times 6 \times 1,276282$ $25.000 = A_1 \times 7,657692$ $A_1 = 3.264,69 \text{ €}$
EJERCICIO 8	
$V_o(p.g.) = 200.000 \text{ €}$ $n = 6$ términos $q = 1,03$ $i = 0,05$ $A = X$	$200.000 = a_1 \times \frac{1 - (1,03)^6 \times V^6}{1,05 - 1,03}$ $200.000 = A_1 \times \frac{1 - (1,03)^6 \times \frac{1}{(1,05)^6}}{1,05 - 1,03}$ $200.000 = A_1 \times \frac{1 - (1,194052 \times 0,746215)}{0,02}$ $200.000 = A_1 \times \frac{0,108980}{0,02}$ $200.000 = A_1 \times 5,449$ $A_1 = 36.703,98 \text{ €}$
EJERCICIO 9	
Opción A $A_1 = 1.000 \text{ €}$ $i = 0,07$ $n = 11$ términos $q = 1,02$	OPCIÓN A $V'_o(p.g.) = 1.000 \times \frac{1 - (1,02)^{11} \times V^{11}}{1,07 - 1,02} \times (1,07)$ $V'_o(p.g.) = 1.000 \times \frac{1 - 1,243374 \times 0,475093}{0,05} \times 1,07$ $V'_o(p.g.) = 1.000 \times \frac{1 - 0,590718}{0,05} \times 1,07$ $V'_o(p.g.) = 8.758,63 \text{ €}$
Opción B $A_1 = 2.000 \text{ €}$ $n = 13$ $q = 1,05$ $i = 0,95$	OPCIÓN B $V'_o(p.g.) = 2.000 \times \frac{1 - (0,95)^{13} \times V^{13}}{1,07 - 0,95} \times (1,07)$ $V'_o(p.g.) = 2.000 \times \frac{1 - 0,513342 \times 0,414964}{0,12} \times 1,07$ $V'_o(p.g.) = 2.000 \times \frac{1 - 0,213018}{0,12} \times 1,07$ $V'_o(p.g.) = 14.034,51 \text{ €}$
EJERCICIO 10	
$q = 1,08$ $A_1 = 500$ $i = 0,08$ anual $n = 7$ años	Si $q = 1+i$ $V'_n(p.g.) = a_1 \times n \times (1+i)^{n-1} \times (1+i)$ $V'_n(p.g.) = 500 \times 7 \times (1,08)^7$ $V'_n(p.g.) = 5.998,38 \text{ €}$
EJERCICIO 11	
$d/V_o = X$ $n = 10$ $A_1 = 6.000 \text{ €}$ $q = 1,02$ $i = 0,05$ $d = 3$	$V_o(p.g.) = 6.000 \times \frac{1 - (1,02)^{10} \times V^{10}}{1,05 - 1,02} \times \frac{1}{(1,05)^3}$ $V_o(p.g.) = 6.000 \times \frac{1 - (1,218994 \times 0,613913)}{0,03} \times 0,863838$ $V_o(p.g.) = 6.000 \times \frac{1 - 0,748356}{0,03} \times 0,863838$ $d/V_o(p.g.) = 43.475,93 \text{ €}$

EJERCICIO 12	
n = 8 términos A ₁ = 8.000 € q = 1,03 i = 0,045 d = 3 años	$d/V'_o(p.g.) = 8.000 \times \frac{1 - (1,03)^8 \times V^8}{1,045 - 1,03} \times (1,045) \times (1,045)^{-3}$ $d/V'_o(p.g.) = 8.000 \times \frac{1 - 1,266770 \times 0,703185}{0,015} \times 0,91573$ $d/V'_o(p.g.) = 8.000 \times \frac{1 - 0,8907737}{0,015} \times 0,91573$ V'o (p.g.) = 53.344,96 €
EJERCICIO 13	
n = 10 términos A ₁ = 4.000 € q = 1,04 i = 0,05 h = 2 años	$h/V_n(p.g.) = a_1 \times \frac{(1+i)^n - q^n}{1+i - q} \times (1+i)^h$ $h/V_n(p.g.) = 4.000 \times \frac{(1,05)^{10} - (1,04)^{10}}{1,05 - 1,04} \times (1,05)^2$ $h/V_n(p.g.) = 4.000 \times \frac{1,628895 - 1,480244}{0,01} \times 1,1025$ $h/V_n(p.g.) = 4.000 \times 14,865034 \times 1,1025$ h/V_n (p.g.) = 65.554,80 €
EJERCICIO 14	
	$h/V'_n(p.g.) = 65.554,80 \times 1,05$ h/V'_n (p.g.) = 68.832,54 €
EJERCICIO 15	
n = 6 años A = 6.250 € q = 30 € i = 0,04 anual	$V_o(p.a.) = a_1 \times A_{n,i} + \frac{q}{i} \times (A_{n,i} - n \times V^n)$ $V_o(p.a.) = 6.250 \times A_{6;0,04} + \frac{30}{0,04} \times (A_{6;0,04} - 6 \times V^6)$ $V_o(p.a.) = 6.250 \times 5,242137 + 750 \times (5,242137 - 6 \times 0,790315)$ $V_o(p.a.) = 32.763,36 + 750 \times 0,500247$ V_o (p.a.) = 33.138,55 €
EJERCICIO 16	
n = 12 años A = 2.750 € q = 40 € i = 0,065 anual	$V_n(p.a.) = a_1 \times S_{n,i} + \frac{q}{i} \times (S_{n,i} - n)$ $V_n(p.a.) = 2.750 \times S_{12;0,065} + \frac{40}{0,065} \times (S_{12;0,065} - 12)$ $V_n(p.a.) = 2.750 \times 17,370711 + 615,384615 \times (17,370711 - 12)$ $V_n(p.a.) = 47.769,46 + 3.305,05$ V_n (p.a.) = 51.074,51 €
EJERCICIO 17	
n = 15 años A = 1.000 € q = 4 € i = 0,05 anual	$V_o(p.a.) = a_1 \times A_{n,i} + \frac{q}{i} \times (A_{n,i} - n \times V^n)$ $V_o(p.a.) = 1.000 \times A_{15;0,05} + \frac{4}{0,05} \times (A_{15;0,05} - 15 \times V^{15})$ $V_o(p.a.) = 1.000 \times 10,379658 + 80 \times (10,379658 - 15 \times 0,481017)$ $V_o(p.a.) = 10.379,66 + 80 \times 3,164403$ V_o (p.a.) = 10.632,81 €
EJERCICIO 18	
n = 8 años A = 1.666 € q = 111 € i = 0,04 anual	$V_n(p.a.) = a_1 \times S_{n,i} + \frac{q}{i} \times (S_{n,i} - n)$ $V_n(p.a.) = 1.666 \times S_{8;0,04} + \frac{111}{0,04} \times (S_{8;0,04} - 8)$ $V_n(p.a.) = 1.666 \times 9,214226 + 2.775 \times (9,214226 - 8)$ $V_n(p.a.) = 15.350,90 + 3.369,48$ V_n (p.a.) = 18.720,38 €
EJERCICIO 19	
n = 7 años A = 5.000 € q = 125 € i = 0,10 anual	- VALOR ACTUAL: $V_o(p.a.) = a_1 \times A_{n,i} + \frac{q}{i} \times (A_{n,i} - n \times V^n)$

	$V_{0(p.a.)} = 5.000 \times A_{7:0,10} + \frac{125}{0,10} \times (A_{7:0,10} - 7 \times V^7)$ $V_{0(p.a.)} = 5.000 \times 4,868419 + 1.250 \times (4,868419 - 7 \times 0,513158)$ $V_{0(p.a.)} = 24.342,10 + 1.250 \times 1,276313$ $V_{0(p.a.)} = 25.937,49 \text{ €}$ - VALOR FINAL: $V_{n(p.a.)} = a_1 \times S_{n,i} + \frac{q}{i} \times (S_{n,i} - n)$ $V_{n(p.a.)} = 5.000 \times S_{7:0,10} + \frac{125}{0,10} \times (S_{7:0,10} - 7)$ $V_{n(p.a.)} = 5.000 \times 9,487171 + 1.250 \times (9,487171 - 7)$ $V_{n(p.a.)} = 47.435,86 + 3.108,96$ $V_{n(p.a.)} = 50.544,82 \text{ €}$
EJERCICIO 20	
$V_{0(p.a.)} = 12.947,70 \text{ €}$ $n = 10 \text{ años}$ $q = 324 \text{ €}$ $i = 0,05 \text{ anual}$	$V_{0(p.a.)} = a_1 \times A_{n,i} + \frac{q}{i} \times (A_{n,i} - n \times V^n)$ $12.947,70 = A \times A_{10:0,05} + \frac{324}{0,05} \times (A_{10:0,05} - 10 \times V^{10})$ $12.947,70 = A \times 7,721735 + 6.480 \times (7,721735 - 10 \times 0,613913)$ $12.947,70 = A \times 7,721735 + 6.480 \times 1,582605$ $12.947,70 = A \times 7,721735 + 10.255,28$ $2.692,42 = A \times 7,721735$ $A = 348,68 \text{ €}$
EJERCICIO 21	
$n = 15 \text{ años}$ $i = 0,07 \text{ anual}$ $V_{0(p.a.)} = 686.250 \text{ €}$ $q = 3.000 \text{ €}$	$V'_{0(p.a.)} = (a_1 \times A_{n,i} + \frac{q}{i} \times (A_{n,i} - n \times V^n)) \times (1+i)$ $686.250 = (A \times A_{15:0,07} + \frac{3.000}{0,07} \times (A_{15:0,07} - 15 \times V^{15})) \times (1,07)$ $641.355,14 = A \times 9,107914 + 42.857,14286 \times (9,107914 - 15 \times 0,362446)$ $641.355,14 = A \times 9,107914 + 42.857,14286 \times 3,671224$ $641.355,14 = A \times 9,107914 + 157.338,17$ $484.016,97 = A \times 9,107914$ $A = 53.142,46 \text{ €}$
EJERCICIO 22	
$n = 18 \text{ años}$ $A_1 = 4.000 \text{ €}$ $q = 40$ $i = 0,01 \text{ anual}$	VALOR INICIAL $V_{0(p.a.)} = (a_1 \times A_{n,i} + \frac{q}{i} \times (A_{n,i} - n \times V^n))$ $V_{0(p.a.)} = (4.000 \times A_{18:0,01} + \frac{40}{0,01} \times (A_{18:0,01} - 18 \times V^{18}))$ $V_{0(p.a.)} = 4.000 \times 16,398269 + 4.000 \times (16,398269 - 18 \times 0,836017)$ $V_{0(p.a.)} = 65.593,08 + 4.000 \times 1,349963$ $V_{0(p.a.)} = 65.593,08 + 5.399,85$ $V_{0(p.a.)} = 70.992,93 \text{ €}$ VALOR FINAL $V_{n(p.a.)} = (a_1 \times S_{n,i} + \frac{q}{i} \times (S_{n,i} - n))$ $V_{n(p.a.)} = (4.000 \times S_{18:0,01} + \frac{40}{0,01} \times (S_{18:0,01} - 18))$ $V_{n(p.a.)} = 4.000 \times 19,614748 + 4.000 \times (19,614748 - 18)$ $V_{n(p.a.)} = 78.458,99 + 6.458,99$ $V_{n(p.a.)} = 84.917,98 \text{ €}$

EJERCICIO 23	
n = 12 términos A1 = 200 € q = 1,05 i = 0,04	VALOR ACTUAL $V_o(p.g.) = a_1 \times \frac{1 - q^n \times V^n}{1 + i - q}$ $V_o(p.g.) = 200 \times \frac{1 - 1,05^{12} \times V^{12}}{1 + 0,04 - 1,05}$ $V_o(p.g.) = 200 \times \frac{1 - 1,795856 \times 0,624597}{-0,01}$ $V_o(p.g.) = \frac{-0,121686}{-0,01}$ Vo (p.g.) = 2.433,73 € VALOR FINAL $V_n(p.g.) = a_1 \times \frac{(1+i)^n - q^n}{1 + i - q}$ $V_n(p.g.) = 200 \times \frac{(1,04)^{12} - (1,05)^{12}}{1,04 - 1,05}$ $V_n(p.g.) = 200 \times \frac{1,601032 - 1,795856}{0,01}$ Vn (p.g.) = 3.896,48 €
EJERCICIO 24	
n = 12 términos A1 = 200 € q = 1,05 i = 0,05	VALOR INICIAL $V_o(p.g.) = a_1 \times n \times V^1$ $V_o(p.g.) = 200 \times 12 \times V^1$ Vo (p.g.) = 2.285,71 € VALOR FINAL $V_n(p.g.) = a_1 \times n \times (1+i)^{n-1}$ $V_n(p.g.) = 200 \times 12 \times (1,05)^{11}$ Vn (p.g.) = 4.104,81 €
EJERCICIO 25	
n = 18 términos A1 = 2.000 q = 1,04 i = 0,07	VALOR ACTUAL $V'_o(p.g.) = a_1 \times \frac{1 - q^n \times V^n}{1 + i - q} \times (1+i)$ $V'_o(p.g.) = 2.000 \times \frac{1 - 1,04^{18} \times V^{18}}{1 + 0,07 - 1,04} \times (1,07)$ $V'_o(p.g.) = 2.000 \times \frac{1 - 2,025817 \times 0,295864}{0,03} \times (1,07)$ $V'_o(p.g.) = 2.000 \times \frac{1 - 0,599366}{0,03} \times 1,07$ V'o (p.g.) = 28.578,56 € VALOR FINAL $V'_n(p.g.) = 2.000 \times \frac{(1,07)^{18} - (1,04)^{18}}{1,07 - 1,04} \times (1,07)$ $V'_n(p.g.) = 2.000 \times \frac{3,379932 - 2,025817}{1,07 - 1,04} \times (1,07)$ $V'_n(p.g.) = 2.000 \times \frac{1,354115}{0,03} \times (1,07)$ V'n (p.g.) = 96.593,54 €
EJERCICIO 26	
n = 18 términos A1 = 2.000 q = 1,07 i = 0,07	VALOR INICIAL $V'_o(p.g.) = a_1 \times n \times V^1 \times (1+i)$ $V'_o(p.g.) = 2.000 \times 18$ Vo (p.g.) = 36.000 € VALOR FINAL $V_n(p.g.) = a_1 \times n \times (1+i)^{n-1} \times (1+i)$ $V_n(p.g.) = 2.000 \times 18 \times (1,07)^{18}$ Vn (p.g.) = 121.677,56 €

EJERCICIO 27	
A ₁ = 1.200 q = 1,1 i = 0,12	$P_{o(p.g.)} = a_1 \times \frac{1}{1+i-q}$ $P_{o(p.g.)} = 1.200 \times \frac{1}{1,12-1,1}$ $P_{o(p.g.)} = 1.200 \times \frac{1}{0,02}$ P_{o(p.g.)} = 60.000 €
EJERCICIO 28	
No tendría valor actual, pues sería una serie divergente → q > 1+i	
EJERCICIO 29	
A ₁ = 8.000 € q = 1,02 i = 0,03	$P'_{o(p.g.)} = a_1 \times \frac{1}{1+i-q} \times (1+i)$ $P'_{o(p.g.)} = 8.000 \times \frac{1}{1,03-1,02} \times (1,03)$ $P'_{o(p.g.)} = 8.000 \times \frac{1}{0,01} \times 1,03$ P'_{o(p.g.)} = 824.000 €
EJERCICIO 30	
n = 10 A ₁ = 6.000 q = 1,05 i = 0,08 d = 3 años	$d/V_{o(p.g.)} = a_1 \times \frac{1-q^n \times V^n}{1+i-q} \times \frac{1}{(1+i)^d}$ $d/V_{o(p.g.)} = 6.000 \times \frac{1-1,05^{10} \times V^{10}}{1+0,08-1,05} \times \frac{1}{(1,08)^3}$ $d/V_{o(p.g.)} = 6.000 \times \frac{1-1,628895 \times 0,463193}{0,03} \times 0,793832$ $V_{o(p.g.)} = 6.000 \times \frac{1-0,754493}{0,03} \times 0,793832$ d/Vo (p.g.) = 38.978,26 €
EJERCICIO 31	
A ₁ = 15.000 n = 10 q = 1,04 i = 0,05 d = 4 años	$d/V'_{o(p.g.)} = a_1 \times \frac{1-q^n \times V^n}{1+i-q} \times (1+i) \times \frac{1}{(1+i)^d}$ $d/V'_{o(p.g.)} = 15.000 \times \frac{1-1,04^{10} \times V^{10}}{1+0,05-1,04} \times (1,05) \times \frac{1}{(1,05)^4}$ $d'_{o(p.g.)} = 15.000 \times \frac{1-1,480244 \times 0,613913}{0,01} \times 0,863838$ $d/V'o (p.g.) = 15.000 \times \frac{1-0,908741}{0,01} \times 0,863838$ d/V'o (p.g.) = 118.249,48 €
EJERCICIO 32	
n = 10 A ₁ = 2.000 € q = 1,05 h = 3 años i = 0,07	$h/V_n(p.g.) = A_1 \times \frac{(1+i)^n \times q^n}{1+i-q} \times (1+i)^h$ $h/V_n(p.g.) = 2.000 \times \frac{(1,07)^{10} - (1,05)^{10}}{1,07-1,05} \times (1,07)^3$ $h/V_n(p.g.) = 2.000 \times \frac{1,967151-1,628895}{1,07-1,05} \times 1,225043$ $h/V_n(p.g.) = 2.000 \times \frac{0,338256}{0,02} \times 1,225043$ V'n (p.g.) = 41.437,81 €
EJERCICIO 33	
A ₁ = 5.500 € i = 0,085 q = 0,975	$P'_{o(p.g.)} = a_1 \times \frac{1}{1+i-q} \times (1+i)$ $P'_{o(p.g.)} = 5.500 \times \frac{1}{1,085-0,975} \times (1,085)$ $P'_{o(p.g.)} = 5.500 \times \frac{1}{0,11} \times 1,085$ P'_{o(p.g.)} = 54.250 €

EJERCICIO 34	
$P_0 = 70.000$ $A_1 = 6.000$ € $q = 1,02$	$P_{o(p.g.)} = a_1 \times \frac{1}{1+i-q}$ $70.000 = 6.000 \times \frac{1}{1+i-1,02}$ $\frac{70.000}{6.000} = \frac{1}{1+i-1,02}$ $11,666667(1+i-1,02) = 1$ $11,666667 + 11,666667i - 11,666667 \times 1,02 = 1$ $11,666667 + 11,666667i - 11,90 = 1$ $11,666667 \times i = 1 - 11,666667 + 11,90$ $11,666667 \times i = 1,233333$ $i = 0,105714$
EJERCICIO 35	
$q = 1,025$ $i = 0,04$ $V'_n = 25.000$ $n = 6 \text{ años}$	$25.000 = A_1 \times \frac{(1,04)^6 - (1,025)^6}{1,04 - 1,025} \times (1,04)$ $25.000 = A_1 \times \frac{1,265319 - 1,159693}{1,04 - 1,025} \times (1,04)$ $25.000 = A_1 \times \frac{0,105626}{0,015} \times (1,04)$ $25.000 = A_1 \times 7,32340267$ $A_1 = 3.413,73 \text{ €}$
EJERCICIO 36	
$A_1 = 250 \text{ €}$ $q = 2,25$ $i = 0,045$	$P_{o(p.a.)} = \frac{1}{i} \times (a_1 + \frac{q}{i})$ $P_{o(p.a.)} = \frac{1}{0,045} \times (250 + \frac{2,25}{0,045})$ $P_o(p.a.) = 6.666,67 \text{ €}$
EJERCICIO 37	
$n = 10$ $A_1 = 4.000$ $q = 200$ $i = 0,06$ $h = 4 \text{ años}$	$h/V_{n(p.a.)} = (a_1 \times S_{n,i} + \frac{q}{i} \times (S_{n,i} - n)) \times (1+i)^h$ $h/V_{n(p.a.)} = (4.000 \times S_{10;0,06} + \frac{200}{0,06} \times (S_{10;0,06} - 10)) \times (1,06)^4$ $h/V_{n(p.a.)} = (4.000 \times 13,180795 + 3.333,33 \times (13,180795 - 10)) \times 1,262477$ $h/V_{n(p.a.)} = (52.723,18 + 10.602,64) \times (1,262477)$ $h/V_{n(p.a.)} = 79.947,39 \text{ €}$
EJERCICIO 38	
$n = 54$ $A_1 = 450$ $q = 25$ $i = 0,08$	VALOR INICIAL $V'_{o(p.a.)} = (a_1 \times A_{n,i} + \frac{q}{i} \times (A_{n,i} - n \times V^n)) \times (1+i)$ $V'_{o(p.a.)} = (450 \times A_{54;0,08} + \frac{25}{0,08} \times (A_{54;0,08} - 54 \times V^{54})) \times (1,08)$ $V'_{o(p.a.)} = (450 \times 12,304103) + (312,50 \times (12,304103 - 54 \times 0,015672)) \times (1,08)$ $V'_{o(p.a.)} = 5.536,85 + (312,50 \times (12,304103 - 0,846288)) \times (1,08)$ $V'_{o(p.a.)} = (5.536,85 + 3.580,57) \times 1,08$ $V'_{o(p.a.)} = 9.846,81 \text{ €}$

	VALOR FINAL: $V'_{n(p.a.)} = (a_1 \times S_{n,i} + \frac{q}{i} \times (S_{n,i} - n)) \times (1+i)$ $V'_{n(p.a.)} = (450 \times S_{54:0,08} + \frac{25}{0,08} \times (S_{54:0,08} - 54)) \times (1,08)$ $V'_{n(p.a.)} = (450 \times 785,114075 + 312,50 \times (785,114075 - 54)) \times 1,08$ $V'_{n(p.a.)} = (353.301,33 + 228.473,15) \times (1,08)$ $V'_{n(p.a.)} = 628.316,44 \text{ €}$
EJERCICIO 39	
n = 8 términos A1 = 15.000 € q = 200 € i = 0,025 d = 3 años	$d/V_o(p.a.) = (a_1 \times A_{n,i} + \frac{q}{i} \times (A_{n,i} - n \times V^n) \times \frac{1}{(1+i)^d}$ $d/V_o(p.a.) = ((15.000 \times A_{8:0,025} + \frac{200}{0,025} \times (A_{8:0,025} - 8 \times V^8)) \times \frac{1}{(1,025)^3}$ $d/V_o(p.a.) = ((15.000 \times 7,170137 + \frac{200}{0,025} \times (7,170137 - 8 \times 0,820747)) \times 0,928599$ $d/V_o(p.a.) = (107.552,06 + \frac{200}{0,025} \times 0,604161) \times 0,928599$ $d/V_o(p.g.) = (107.552,06 + 4.833,29) \times 0,928599$ $d/V_o(p.g.) = 104.360,92 \text{ €}$
EJERCICIO 40	
A1 = 2.000 € q = 54 € i = 0,03	$P'_{o(p.a.)} = \frac{1}{i} \times (a_1 + \frac{q}{i}) \times (1+i)$ $P'_{o(p.a.)} = \frac{1}{0,03} \times (2.000 + \frac{54}{0,03}) \times (1,03)$ $P'_{o(p.a.)} = (33,333333 \times 3.800) \times 1,03$ $P'_{o(p.a.)} = 130.466,67 \text{ €}$
EJERCICIO 41	
A1 = 1.500 q = 25 € i = 0,055 d = 2 años	$d/P'_{o(p.a.)} = (\frac{1}{i} \times (a_1 + \frac{q}{i}) \times (1+i) \times \frac{1}{(1+i)^d}$ $d/P'_{o(p.a.)} = \frac{1}{0,055} \times (1.500 + \frac{25}{0,055}) \times (1,055) \times \frac{1}{(1,055)^2}$ $d/P'_{o(p.a.)} = (18,181818 \times 1.954,55) \times 0,947867$ $d/P'_{o(p.a.)} = 33.684,61 \text{ €}$
EJERCICIO 42	
n = 24 A1 = 10.000 € q = 200 i = 0,04 d = 4	$d/V'_{o(p.a.)} = (a_1 \times A_{n,i} + \frac{q}{i} \times (A_{n,i} - n \times V^n) \times (1+i) \times \frac{1}{(1+i)^d}$ $d/V'_{o(p.a.)} = ((10.000 \times A_{24:0,04} + \frac{200}{0,04} \times (A_{24:0,04} - 24 \times V^{24})) \times (1,04) \times \frac{1}{(1,04)^4}$ $d/V'_{o(p.a.)} = ((10.000 \times 15,246963 + \frac{200}{0,04} \times (15,246963 - 24 \times 0,390121)) \times 0,888996$ $d/V'_{o(p.a.)} = (152.469,63 + \frac{200}{0,04} \times 5,884059) \times 0,888996$ $d/V_o(p.g.) = (152.469,63 + 29.420,30) \times 0,888996$ $d/V_o(p.g.) = 161.699,42 \text{ €}$

EJERCICIO 43	
A1 = 8.000 € q = 80 i = 0,025 d = 4 años	$d/P'_{o(p.a.)} = \left(\frac{1}{i} \times (a_1 + \frac{Q}{i}) \right) \times (1+i) \times \frac{1}{(1+i)^d}$ $d/P'_{o(p.a.)} = \frac{1}{0,025} \times (8.000 + \frac{80}{0,025}) \times (1,025) \times \frac{1}{(1,025)^4}$ $d/P'_{o(p.a.)} = 40 \times 11.200 \times 0,928599$ d/ P'o (p.a.) = 416.012,35 €
EJERCICIO 44	
n = 12 A1 = 200 q = 0,10 i = 0,018 h = 2 años	$h/V'_{n(p.a.)} = (a_1 \times S_{n,i} + \frac{q}{i} \times (S_{n,i} - n)) \times (1+i) \times (1+i)^h$ $h/V'_{n(p.a.)} = (200 \times S_{12;0,018} + \frac{0,1}{0,018} \times (S_{12;0,018} - 12)) \times (1,018) \times (1,018)^2$ $V'_{n(p.a.)} = (200 \times 13,262252 + 5,555556 (13,262252 - 12)) \times 1,054978$ $V'_{n(p.a.)} = (2.652,45 + 7,012512) \times 1,054978$ V' n (p.a.) = 2.805,67 €
EJERCICIO 45	
A = 24 € n = 6 años i = 0,07 anual	$V_0 = 24 \times A_{6;0,07}$ V₀ = 114,40 € $V_n = 24 \times S_{6;0,07}$ V_n = 171,68 €
EJERCICIO 46	
n = 12 años i = 0,08 anual V ₀ = 900 €	$V_0 = 1.687 \times A_{8;0,10}$ V₀ = 9.000,02 €
EJERCICIO 47	
n = 10 años A = 60 € i = 0,06 anual	APARTADO A $900 = A \times A_{12;0,08} \times (1,08)$ A = 110,58 € APARTADO B $900 = A \times A_{12;0,08}$ A = 119,43 €
EJERCICIO 48	
	$V_n = 60 \times S_{10;0,06}$ V_n = 790,85 €
EJERCICIO 49	
d = 6 d/V'o = X i = 0,07 anual n = 10 años	$1.719,78 = A \times A_{10;0,07} \times (1,07) \times \frac{1}{(1,07)^6}$ A = 343,43 €
EJERCICIO 50	
A = 180 € n = 15 años i = 0,07 anual	APARTADO A $V_0 = 180 \times A_{15;0,07}$ V₀ = 1.639,42 € $V_n = 180 \times S_{15;0,07}$ V_n = 4.523,22 € APARTADO B $d/V'_0 = 180 \times A_{15;0,07} \times (1,07) \times \frac{1}{(1,07)^6}$ V₀ = 1.168,89 € $d/V'_0 = 180 \times S_{15;0,07} \times (1,07)$ V_n = 4.839,85 €
APARTADO 51	
n = 6 años A = 420 € i = 0,07 anual	$V_0 = 420 \times A_{6;0,07}$ V₀ = 2.001,95 €

APARTADO 52	
n = infinitos A = 240 € i = 0,06 anual	APARTADO A $P_o = \frac{240}{0,06}$ $P_o = 4.000 \text{ €}$ APARTADO B $P'_o = \frac{240}{0,06} \times 1,06$ $P'_o = 4.240 \text{ €}$ APARTADO C $d/P_o = \frac{240}{0,06} \times \frac{1}{(1,06)^2}$ $d/P_o = 3.559,99 \text{ €}$ APARTADO D $d/P_o = \frac{240}{0,06} \times (1,06) \times \frac{1}{(1,06)^2}$ $d/P'_o = 3.773,58 \text{ €}$
EJERCICIO 53	
A = 9.000 € d = 2 años i = 0,07 anual	$d/P_o = \frac{9.000}{0,07} \times \frac{1}{(1,07)^3}$ $d/P_o = 104.952,58 \text{ €}$
EJERCICIO 54	
V _o = 2.000 € E = 300 € i = 0,075 anual n = 2 años	$2.000 = 300 + (A \times A_{2;0,075})$ $A = 946,78 \text{ €}$
EJERCICIO 55	
A = 600 € n = 12 años i = 0,07 anual	$V_n = 600 \times S_{12;0,07}$ $V_n = 11.054,24 \text{ €}$
EJERCICIO 56	
V _o = 5.000 € n = 6 años i = 0,12 anual	$5.000 = A \times A_{6;0,12}$ $A = 1.216,13 \text{ €}$
EJERCICIO 57	
n = 8 años V _n = 8.000 € i = 0,10 anual	$8.000 = A \times S_{8;0,10}$ $V_n = 699,55 \text{ €}$
EJERCICIO 58	
C _n = 10.000 € n = 15 años i = 0,08 anual	APARTADO A $10.000 = C_o (1,08)^{15}$ $C_o = 3.152,42 \text{ €}$ APARTADO B $10.000 = A \times S_{15;0,08}$ $A = 368,30 \text{ €}$
EJERCICIO 59	
A = 100 € n = 5 años i = 0,10 anual	$V'_o = 100 \times A_{5;0,10} \times 1,10$ $V'_o = 416,99 \text{ €}$
EJERCICIO 60	
V' _o = 12.000 € n = 12 años i = 0,12	$12.000 = A \times A_{12;0,12} \times 1,12$ $A = 1.729,68 \text{ €}$
EJERCICIO 61	
A ₁ = 6.000 € n = 10 términos q = 1,05 i = 0,08 anual	$d/V_o(p.g.) = 6.000 \times \frac{1 - 1,05^{10} \times V^{10}}{1 + 0,08 - 1,05} \times \frac{1}{(1,08)^3}$ $d/V_o(p.g.) = 38.978,21$

d = 3 años	
EJERCICIO 62	
A1 = 15.000 € n = 10 términos q = 1,04 i = 0,05 anual d = 4 años	$d/V'_{o(p.g.)} = 15.000 \times \frac{1 - 1,04^{10} \times V^{10}}{1 + 0,05 - 1,04} \times (1,04) \times \frac{1}{(1,05)^4}$ $d/V'o(p.g.) = 118.248,68 \text{ €}$
EJERCICIO 63	
A1 = 250 € q = 2,25 i = 0,045 anual	$P_{o(p.a.)} = \frac{1}{0,045} \times \left(250 + \frac{2,25}{0,045} \right)$ $P_o(p.a.) = 6.666,67 \text{ €}$
EJERCICIO 64	
n = 10 años A = 4.000 € q = 200 € i = 0,06 anual h = 4	$h/v_n(p.a.) = (4.000 \times S_{10:0,06} + \frac{200}{0,06} \times (S_{10:0,06} - 10)) \times (1,06)^4$ $h/V_n = 79.947,40 \text{ €}$