

Practise, Apply, Solve 2.7, page 151

1. (a) 2.158 925 (b) 1.973 823 (c) 2.032 794
(d) 1.348 850 (e) 4.247 851 (f) 10.401 270
2. (a) 53 175.25 (b) 11 433.50
(c) 47 898.65 (d) 1 247 260.00
3. (a) $i = 3\%$, $n = 12$ (b) $i = 6.5\%$, $n = 10$
(c) $i = 1.5\%$, $n = 84$ (d) $i = 0.25\%$, $n = 260$
4. (a) 2014.06 (b) 163 688.28 (c) 18 783.01
6. (a) \$13 416.80, \$12 308.99, \$11 292.65, \$10 360.23, \$9504.80, \$8720, \$8000, $A = 8000 + 8000(1.09) + 8000(1.09)^2 + \dots + 8000(1.09)^6$, \$73 603.48
(b) \$379.60, \$365.00, \$350.96, \$337.46, \$324.48, \$312, \$300; $A = 300 + 300(1.04) + \dots + 300(1.04)^6$; \$2369.49
(c) \$861.51, \$844.62, \$828.06, \$811.82, \$795.91, \$780.30, \$765, \$750; $A = 750 + 750(1.02) + \dots + 750(1.02)^7$; \$6437.23
7. 4 years, each divided into 4 equal segments. Amount of each payment, proceeding from most recent to first: 1600, $1600(1.025)^1$, $1600(1.025)^2$, ..., $1600(1.025)^{39}$
8. (a) 10 years with no divisions. Amount of each payment, proceeding from most recent to first: 5000, $5000(1.05)^1$, $5000(1.05)^2$, ..., $5000(1.05)^9$
 $A = 5000 + 5000(1.05) + \dots + 5000(1.05)^8 + 5000(1.05)^9$; \$62 889.46
(b) 5 years, each divided into 4 equal segments. Amount of each payment, proceeding from most recent to first: 750, $750(1.02)^1$, $750(1.02)^2$, ..., $750(1.02)^{19}$;
 $A = 750 + 750(1.02) + \dots + 750(1.02)^{19}$; \$18 223.03
(c) 2 years, each divided into 52 equal segments. Amount of each payment, proceeding from most recent to first: 50, $50(1.0025)^1$, $50(1.0025)^2$, ..., $50(1.0025)^{103}$;
 $A = 50 + 50(1.0025) + \dots + 50(1.0025)^{102} + 50(1.0025)^{103}$; \$5930.19
(d) 7 years, each divided into 2 equal segments. Amount of each payment, proceeding from most recent to first: 4300, $4300(1.0475)^1$, $4300(1.0475)^2$, ..., $4300(1.0475)^{13}$;
 $A = 4300 + 4300(1.045) + \dots + 4300(1.045)^{13}$; \$81 408.07
9. For all time lines, shift all payments in the corresponding timelines from question 8 one conversion period to the left.
(a) $A = 5000(1.05)^1 + 5000(1.05)^2 + \dots + 5000(1.05)^{10}$
= \$66 033.94
(b) $A = 750(1.02)^1 + 750(1.02)^2 + \dots + 750(1.02)^{20}$
= \$18 587.49
(c) $A = 50(1.0025)^1 + 50(1.0025)^2 + \dots + 50(1.0025)^{104}$
= \$5945.01
(d) $A = 4300(1.0475)^1 + 4300(1.0475)^2 + \dots + 4300(1.0475)^{14}$
= \$85 071.43
10. (a) 3 years, each divided into 12 segments. Amount of each payment (R) proceeding from most recent to first: R , $R(1.005)^1$, $R(1.005)^2$, ..., $R(1.005)^{35}$
(b) $S_{36} = R + R(1.005) + \dots + R(1.005)^{35}$
(c) \$762.66
11. \$7599.64
12. \$36 724.36
13. yes
14. *Example:* Both formulas are based on being able to express the future value of the payments as a geometric series. This can only be accomplished if the payment and interest interval coincide.
15. (a) 3 years, each divided into 12 segments. Amount of each payment, proceeding from most recent to first: 75, $75(1.005)^1$, $75(1.005)^2$, ..., $75(1.005)^{35}$
(b) $A = 75 + 75(1.005) + 75(1.005)^2 + \dots + 75(1.005)^{35}$
(c) \$2950.21
(d) nonlinear with points (month, balance) at $\{(1, 75), (2, 150.38), (3, 226.13), \dots (36, 2950.21)\}$
(e) 60
16. (a) 20
(b) nonlinear with points (quarter, balance) at $\{(1, 2000), (2, 4030), (3, 6090.45), \dots (20, 46 247.33)\}$
17. (a) n years, each divided into 4 segments. Amount of each payment, proceeding from most recent to first: 450, $450(1.021)^1$, $450(1.021)^2$, ..., $450(1.021)^{n-2}$, $450(1.021)^{n-1}$
(b) $S_n = 24\,000 = 450 + 450(1.021) + \dots + 450(1.021)^{n-1}$
(c) 16 years old
(d) 1 year or 4 quarters
18. \$2584.07
19. (a) 20 years, each divided into 12 segments. Amount of each payment (R) proceeding from most recent to first: R , $R(1.005\,25)^1$, $R(1.005\,25)^2$, ..., $R(1.005\,25)^{239}$
(b) $S_{240} = R + R(1.00525) + R(1.00525)^2 + \dots + R(1.00525)^{238} + R(1.00525)^{239}$
(c) \$167.08 (d) \$268.12 (e) \$8162.40
20. \$24 317.34
21. Answers will vary. However, in most cases, it is more advantageous to double the interest.
22. (a) By starting her deposits earlier, her deposits would be reduced substantially for two reasons. She would be making an extra 60 payments and these 60 payments would accumulate interest over an extra five years.
(b) \$181.59
23. (a) 5 years, each divided into 2 segments. Amount of each payment, proceeding from most recent to first: 3000, $3000(1.04)^2$, $3000(1.04)^4$, $3000(1.04)^6$, $3000(1.04)^8$
(b) \$17 656.04
24. \$358.22