

Practise, Apply, Solve 2.10, page 178

1. (a) $1 + i$ (b) $1 + i$ (c) $1 + i$ (d) $1 + i$
2. (a) 1.1236 (b) 1.3605 (c) 1.0380 (d) 1.4233
3. (a) 0.1038 (b) 0.1268 (c) 0.0488 (d) 0.0012
(e) 0.0296 (f) 0.0083 (g) 0.0023 (h) 0.1533
4. (a) 8.16% (b) 8.24% (c) 10.95%
(d) 9.15% (e) 19.25% (f) 23.14%
5. (a) 19.25% (b) 18.40% (c) 17.77%
(d) 17.64% (e) 17.61%
6. (a) 10 years, with no divisions. Amount of each payment, proceeding from most recent to first:
 $5000, 5000(1.0816)^1, 5000(1.0816)^2, \dots, 8000(1.0816)^9$
 $S_{10} = 5000 + 5000(1.0816) + 5000(1.0816)^2 + \dots$
 $+ 5000(1.0816)^9, \$72\,985.49$
 (b) 5 years, each divided into 4 segments. Amount of each payment, proceeding from most recent to first: 800,
 $800(1.019\,426\,547)^1, 800(1.019\,426\,547)^2, \dots,$
 $800(1.019\,426\,547)^{19}; S_{20} = 800 + 800(1.019\,426\,547)$
 $+ 800(1.019\,426\,547)^2 + \dots + 800(1.019\,426\,547)^{19},$
 $\$19\,327.29$
 (c) 2 years, each divided into 52 segments. Amount of each payment, proceeding from most recent to first: 150, $150(1.001\,878\,304)^1,$
 $150(1.001\,878\,304)^2, \dots, 150(1.001\,878\,304)^{103}$
 $S_{104} = 150 + 150(1.001\,878\,304) + 150(1.001\,878\,304)^2 + \dots$
 $+ 150(1.001\,878\,304)^{103}, \$17\,210.15$
 (d) 7 years, each divided into 2 segments. Amount of each payment, proceeding from most recent to first: 3300,
 $3300(1.050\,625)^1, 3300(1.050\,625)^2, \dots, 3300(1.050\,625)^{13}$
 $S_{14} = 3300 + 3300(1.050\,625) + 3300(1.050\,625)^2 + \dots +$
 $3300(1.050\,625)^{13}, \$64\,956.71$
 (e) 3 years, each divided into 12 segments. Amount of each payment, proceeding from most recent to first: 1000,
 $1000(1.007\,207\,323)^1, 1000(1.007\,207\,323)^2, \dots,$
 $1000(1.007\,207\,323)^{35}$
 $S_{36} = 1000 + 1000(1.007\,207\,323) + 1000(1.007\,207\,323)^2$
 $+ \dots + 1000(1.007\,207\,323)^{35}, \$40\,934.61$
7. 18 months, each segment is one month. Present value of each payment (R) proceeding from most recent to first: $R(1.013\,888\,430\,3)^{-18},$
 $R(1.013\,888\,430\,3)^{-17}, R(1.013\,888\,430\,3)^{-16}, \dots,$
 $R(1.013\,888\,430\,3)^{-1}; \$221.10$
8. (a) 3.5 years, each year divided into 52 segments. Amount of each payment (R) proceeding from most recent to first: $R,$
 $R(1.001\,381\,431)^1, R(1.001\,381\,431)^2, \dots,$
 $R(1.001\,381\,431)^{181}$
 (b) $S_{182} = R + R(1.001\,381\,431) + \dots + R(1.001\,381\,431)^{181}$
 (c) \$120.91
9. (a) \$8755.62
 (b) The 0.782 129%/month interest rate is very close to the 9.8%/a compounded monthly he was charged in section 2.8. Also, because the loan was for such a short period of time (3 years), the difference in the two rates has little effect on the present value.
10. (a) *Example:* Michael needs \$2800 to go travelling in one year. How much must he deposit at the end of every three months into an account that pays 8%/a compounded quarterly?
 (b) *Example:* Alisha buys a new car by agreeing to mature equal monthly payments of \$350 for 5 years at a rate of 6%/a compounded semiannually. What did she pay for the car?
11. \$92.49
12. (a) \$74 118.37, \$74 402.62, \$74 650.93, \$74 690.11, \$74 700.23
 (b) Considering they are saving for a fairly lengthy period of time (6 years), the compounding period does not have a significant effect on their total savings. However, compounding daily is preferred over compounding yearly if the annual rate is fixed.
13. (a) \$71 779.39 (b) \$73 048.96
 (c) \$74 283.82 (d) \$74 317.12
 (e) The greater the frequency of the payments, the greater the value of the savings. By going from yearly to daily deposits they can save an additional \$2537.73.
14. (a) \$75 443.35, \$76 791.50, \$71 536.58
 (b) A change from 6%/a to 7.8%/a would enable them to save an additional \$3906.77.
15. (a) \$81 530.21, \$66 706.54, \$71 267.67
 (b) A decrease in their deposits by \$32 to \$800 would result in a decrease in savings of about \$2850.
16. (a) \$74 549.05 (b) \$59 523.36
 (c) \$63 809.04 (d) \$81 805.34
 (e) The sooner they begin to save, the sooner their savings can accumulate compound interest. The longer time period they save, the more they can accumulate.
17. Key features should include: start saving now, do not wait; make deposits as large and as often as possible; shop for best interest rate; save for as long as you can to accumulate a larger deposit; the compounding period is not as important but look for shortest compounding period if the interest rates are the same.
18. (a) 21% (b) \$557.44
19. 12%/a compounded monthly will produce 1%/month compounded monthly. This means that for the second and third months, interest will be earned on the 1% interest earned in the previous month. After 3 months, the initial deposit will grow by $(1.01)(1.01)(1.01),$ 1.030 301 times its value, or 3.0301% over 3 months while 12%/a compounded quarterly earns 3% over 3 months. Therefore, 12%/a compounded monthly is a greater rate than 12%/a compounded quarterly.
20. (a) 20.04% (b) 1%
21. (a) no (b) yes