

Chapter 2, Review and Practice, page 197

- $t_n = a + (n - 1)d$; t_n : the n th term, n : number of terms in sequence, a : first term, d : common difference
 - A series is the sum of all of the terms in a sequence. To add the first n terms of an arithmetic series, use $S_n = \frac{n}{2}[2a + (n - 1)d]$ where n is the position of the term in the series, a is the first term, and d is the common difference between each term in the series.
 - 1768
 - 828
 - 95
 - $\frac{377}{6}$
 - 2198
 - 42, -39, -36, -33
 - \$1017
 - $t_n = r^{n-1}$; t_n : n th term, n : number of terms, a : first term, r : common ratio
 - $a + ar + \dots + ar^{n-2} + ar^{n-1}$ The formula used to add the first n terms of a geometric series is $S_n = \frac{a(r^n - 1)}{r - 1}$ where n is the position of the term in the sequence, a is the first term, and r is the common ratio between each term.
 - 1 953 124
 - 51 889
 - 127 500
 - 6415.29
 - (a) \$28 474.08 (b) \$284 623.03
 - (a) 11 tickets (b) \$114 270
 - An annuity is an investment plan in which fixed amounts of money are deposited or paid out at regular intervals over a specified period of time. An ordinary annuity is an annuity in which periodic payments are made at the end of each time interval, whereas an annuity due is an annuity in which periodic payments are made at the beginning of each time interval.
 - The amortization period of a loan or mortgage is the length of time that it would take for the debt to be paid in full if all blended payments (payments used to pay both the interest and the principal) are made punctually. An amortization table is used to show the amount of the regular blended payment, how much of the payment is interest, how much is used to reduce the principal, and the outstanding balance after each payment. A spreadsheet is useful in creating amortization tables and for analyzing the effects of changing the parameters of a loan problem.
 - 0.5%
 - Ewen's savings plan is an example of an ordinary simple annuity because his payments are made at the end of each time interval and his periodic payments correspond to the interest conversion period (both calculated monthly).
- | A | B | C | D | E |
|-----------|-------|-------------|-------------|-----------|
| 1 Pay. # | Pay. | Int. Paid | Princ. Paid | Out. Bal. |
| 2 0 | | | | \$2400 |
| 3 =A2 + 1 | \$130 | =E2 * 0.015 | =B3 - C3 | =E2 - D3 |
- about 21.78 months (about 1.81 years); \$101.27
 - \$2831.40
 - \$153.13
- 20%/a
 - \$567.10
 - R : amount of periodic payment, i : interest rate for each period, n : number of periods
 - $S_n = \frac{a(r^n - 1)}{r - 1}$ and $FV = \frac{R \times (1 + i)^n - 1}{i}$.
 - (a) 17 years, each divided into 4 segments. Amount of each payment proceeding most recent to the first: 450, 450(1.02)¹, 450(1.02)², ..., 450(1.02)⁶⁷
 (b) $S_{68} = 450 + 450(1.02) + \dots + 450(1.02)^{66} + 450(1.02)^{67}$
 (c) $S_{68} = \$63\,995.64$, $i = \$33\,395.64$
 - (a) 20 months each segment is one month. Amount of each payment (R) proceeding from most recent to first:
 R , $R(1.0075)^1$, $R(1.0075)^2$, ..., $R(1.0075)^{19}$

- $S_{20} = R + R(1.0075) + \dots + R(1.0075)^{18} + R(1.0075)^{19}$
 (c) \$148.90
 - (a) n years each divided into 12 segments. Amount of each payment, proceeding from most recent to first:
 75 , $475(1.005)^1$, $475(1.005)^2$, ..., $475(1.005)^{n-2}$, $475(1.005)^{n-1}$, $475(1.005)^n$
 (b) $S_n = 475 + 475(1.005) + \dots + 475(1.005)^{n-2} + 475(1.005)^{n-1}$
 (c) 55 months (about 4.67 years)
 (d) \$554.55
 - The present value is the sum of all the equivalent present values of each of the payments at the beginning of the term, whereas the future value is the sum of all the future values of each payment at the end of the term.
 - (a) 9 years, no divisions. Present value of each payment, proceeding from most recent to first:
 $3000(1.05)^{-9}$, $3000(1.05)^{-8}$, $3000(1.05)^{-7}$, ..., $3000(1.05)^{-1}$
 $PV = 3000(1.05)^{-9} + 3000(1.05)^{-8} + \dots + 3000(1.05)^{-1}$,
 $\$21\,323.47$
 (b) 5 years, each divided into 4 segments. Present value of each payment, proceeding from most recent to first: $500(1.015)^{-20}$, $500(1.015)^{-19}$, $500(1.015)^{-18}$, ..., $500(1.015)^{-1}$
 $PV = 500(1.015)^{-20} + 500(1.015)^{-19} + \dots + 500(1.015)^{-2} + 500(1.015)^{-1}$, \$8584.32
 - (a) \$1499.51 (b) \$200.49
 - (a) 4 years, each divided into 4 segments. Present value of each payment (R) proceeding from most recent to first:
 $R(1.025)^{-16}$, $R(1.025)^{-15}$, $R(1.025)^{-14}$, ..., $R(1.025)^{-1}$
 (b) $PV = R(1.025)^{-16} + R(1.025)^{-15} + \dots + R(1.025)^{-2} + R(1.025)^{-1}$
 (c) \$704.71
 - A simple annuity is an annuity where the periodic payment corresponds to the interest conversion period, whereas a general annuity is an annuity where the periodic payment does not correspond to the interest conversion period.
 - (a) 15.865% (b) 14.816% (c) 14.746%
 - (a) 3 years, each divided into 12 segments. Amount of each payment, proceeding from most recent to first: 270, $270(1.0041)^1$, $270(1.0041)^2$, ..., $270(1.0041)^{35}$
 (b) $S_{36} = 270 + 270(1.0041) + \dots + 270(1.0041)^{34} + 270(1.0041)^{35}$
 (c) \$10 450.94 (d) \$167.82
 - (a) 4 years, each divided into 12 segments. Present value of each payment (R) proceeding from most recent to first:
 $R(1.014)^{-48}$, $R(1.014)^{-47}$, $R(1.014)^{-46}$, ..., $R(1.014)^{-1}$
 (b) $PV = R(1.014)^{-48} + \dots + R(1.014)^{-2} + R(1.014)^{-1}$
 (c) \$249.54
 - (a) \$253.40 (b) 9 payments less (c) \$252.12
 - (a) \$723.09, \$788.43 (b) \$27 704.40 (c) choose shorter term
 - (a) \$625.92 (b)
- | Pay. # | Pay. | Int. Paid
0.688%/a | Princ. Paid | Bal. |
|--------|----------|-----------------------|-------------|------------|
| 0 | | | | \$43800.00 |
| 1 | \$624.90 | \$301.34 | \$323.56 | \$43476.44 |
| 2 | \$624.90 | \$299.12 | \$325.78 | \$43150.66 |
| 95 | \$624.90 | \$8.51 | \$616.39 | \$620.73 |
| 96 | \$624.90 | \$4.27 | \$620.63 | \$0.10 |
- \$16 191.90
 - 1158 weeks (about 22.27 years)
 - \$282 543.18 (c) \$40 154.77
 - (a) \$766.52
 (b) year 1: \$176 290.35, year 2: \$170 468.67, year 3: \$164 532.76, year 4: \$158 480.39, year 5: \$152 309.25
 (c) \$486.31, \$571.79 (d) \$659.16
 (e) \$116 918.90