

We find the arithmetic series, S_{98} , having $a = 1$ and $d = 1$.

$$\begin{aligned} S_{98} &= \frac{98}{2} [2(1) + 97(1)] \\ &= \frac{98 \times 99}{2} \\ &= 4851 \end{aligned}$$

From S_{98} we subtract the missing terms to obtain the sum of the given series.

$$\begin{aligned} \text{Sum} &= S_{98} - 3 - 6 - 9 - 12 - 15 - 18 - 21 - 24 - 27 - 30 - 33 \\ &\quad - 36 - 39 - 42 - 45 - 48 - 51 - 54 - 57 - 60 - 63 - 66 \\ &\quad - 69 - 72 - 75 - 78 - 81 - 84 - 87 - 90 - 93 - 96 - 99 \\ &= 4851 - 1683 \\ &= 3168 \end{aligned}$$

21. (a) $a = \frac{1}{2}$ and $r = \frac{1}{2}$

$$\begin{aligned} S_n &= \frac{\frac{1}{2} \left[\left(\frac{1}{2} \right)^n - 1 \right]}{\frac{1}{2} - 1} \\ &= \frac{\frac{1}{2} \left[\left(\frac{1}{2} \right)^n - 1 \right]}{-\frac{1}{2}} \\ &= -1 \left[\left(\frac{1}{2} \right)^n - 1 \right] \end{aligned}$$

As n gets larger and larger, $\left(\frac{1}{2} \right)^n$ gets closer and closer to 0.

Therefore, $S_{\infty} = -1(0 - 1) = 1$. The sum of the series is 1.

(b) No, if the value of r is greater than one, say $r = 2$, then the series keeps getting larger and larger as n gets larger and larger. Therefore, it is not possible to find the sum.

(c) It is possible to determine the sum of an infinite geometric series if the series converges (r is between -1 and 1).

Practice 2.4, page 128

(a) Modify the spreadsheet as shown. Use it and the SUM feature to calculate the total interest earned over the first 8 years. The table and graph are shown below.

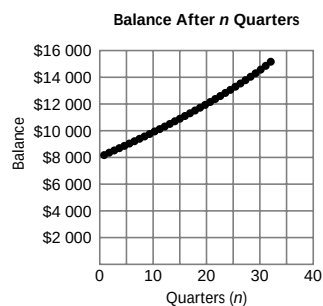
	A	B	C	D
1	Period	Previous	Interest	Year End
2		Balance	At 4.0%/a	Balance
3	1	2000	=B3 * 0.04	=B3 + C3
4	=A3 + 1	=D3	=B4 * 0.04	=B4 + C4
			Total Interest after 8 years = \$737.14	Balance after 8 years = \$2737.14

Period	Previous Balance	Interest At 4.0%/a	Year End Balance
1	\$2,000.00	\$80.00	\$2,080.00
2	\$2,080.00	\$83.20	\$2,163.20
3	\$2,163.20	\$86.53	\$2,249.73
4	\$2,249.73	\$89.99	\$2,339.72
5	\$2,339.72	\$93.59	\$2,433.31
6	\$2,433.31	\$97.33	\$2,530.64
7	\$2,530.64	\$101.23	\$2,631.86
8	\$2,631.86	\$105.27	\$2,737.14
		\$737.14	

(b) Modify the spreadsheet as shown. Use it and the SUM feature to calculate the total interest earned over the first 8 years. The table and graph are shown below.

	A	B	C	D
1	Period	Previous	Interest	Year End
2		Balance	At 8.0%/a	Balance
3	1	8000	=B3 * 0.02	=B3 + C3
4	=A3 + 1	=D3	=B4 * 0.02	=B4 + C4
			Total Interest after 8 years = \$7076.32	Balance after 8 years = \$15 076.32

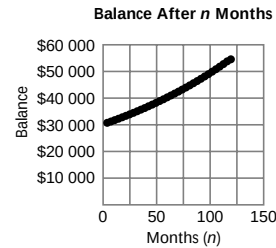
Period	Previous Balance	Interest At 8.0%/a	Quarterly Balance
1	\$8,000.00	\$160.00	\$8,160.00
2	\$8,160.00	\$163.20	\$8,323.20
3	\$8,323.20	\$166.46	\$8,489.66
4	\$8,489.66	\$169.79	\$8,659.46
5	\$8,659.46	\$173.19	\$8,832.65
6	\$8,832.65	\$176.65	\$9,009.30
7	\$9,009.30	\$180.19	\$9,189.49
8	\$9,189.49	\$183.79	\$9,373.28
9	\$9,373.28	\$187.47	\$9,560.74
10	\$9,560.74	\$191.21	\$9,751.96
11	\$9,751.96	\$195.04	\$9,946.99
12	\$9,946.99	\$198.94	\$10,145.93
13	\$10,145.93	\$202.92	\$10,348.85
14	\$10,348.85	\$206.98	\$10,555.83
15	\$10,555.83	\$211.12	\$10,766.95
16	\$10,766.95	\$215.34	\$10,982.29
17	\$10,982.29	\$219.65	\$11,201.93
18	\$11,201.93	\$224.04	\$11,425.97
19	\$11,425.97	\$228.52	\$11,654.49
20	\$11,654.49	\$233.09	\$11,887.58
21	\$11,887.58	\$237.75	\$12,125.33
22	\$12,125.33	\$242.51	\$12,367.84
23	\$12,367.84	\$247.36	\$12,615.19
24	\$12,615.19	\$252.30	\$12,867.50
25	\$12,867.50	\$257.35	\$13,124.85
26	\$13,124.85	\$262.50	\$13,387.34
27	\$13,387.34	\$267.75	\$13,655.09
28	\$13,655.09	\$273.10	\$13,928.19
29	\$13,928.19	\$278.56	\$14,206.76
30	\$14,206.76	\$284.14	\$14,490.89
31	\$14,490.89	\$289.82	\$14,780.71
32	\$14,780.71	\$295.61	\$15,076.32
		\$7,076.32	



(c) The total interest earned over the first 8 years for part (a) is \$737.14 as shown above and for part (b) is \$1373.27 as shown above.

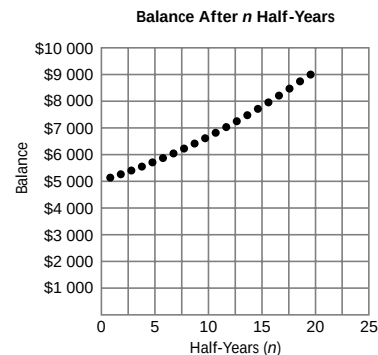
(d) Modify the spreadsheet as shown below.

	A	B	C	D
1	Period	Previous	Interest	Monthly
2		Balance	At 6.0%/a	Balance
3	1	30 000	=B3 * 0.005	=B3 + C3
4	=A3 + 1	=D3	=B4 * 0.005	=B4 + C4
				Balance After 10 years = \$54 581.90



(e) Modify the spreadsheet as shown below.

	A	B	C	D
1	Period	Previous	Interest	Semi-Annual
2		Balance	At 6.0%/a	Balance
3	1	5000	=B3 * 0.03	=B3 + C3
4	=A3 + 1	=D3	=B4 * 0.03	=B4 + C4
				Balance After 10 years = \$9030.56



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1. (a) Her periodic payment is \$600.
- (b) Her savings plan is an example of an ordinary annuity because the periodic payment is made at the end of every 3 months.
- (c) It is simple annuity because both the deposit and interest conversion periods are every 3 months.
- (d) Interest earned = $\$6569.83(0.02) = \$131.40$
New balance = $\$6569.83 + \$131.40 + \$600 = \$7301.23$
- (e) Change cell B3 from 0 to 1500.