

Practise, Apply, Solve 1.1, page 21

1. (a) 625, 3125, 15 625, 78 125 (b) 0, -4, -8, -12
(c) 32, 38, 44, 50 (d) $\frac{1}{25}, \frac{1}{36}, \frac{1}{49}, \frac{1}{64}$
(e) 98 765, 987 654, 9 876 543, 98 765 432
(f) -48, 96, -192, 384 (g) 35, 57, 92, 149
(h) 106, 156, 216, 286 (i) 32, 256, 8192, 2 097 152
(j) 125, 216, 343, 512 (k) 1.1, 1.3, 1.5, 1.7
(l) 0.75, 0.375, 0.1875, 0.093 75
2. (a) not predictable (b) 1032, 1034, 1036, 1038
(c) not predictable (d) 768, 1536, 3072, 6144
(e) \$49 134.06, \$51 099.42, \$53 143.40, \$55 269.14
(f) not predictable
3. (a) 5, 6, 7, 8, 9 (b) -1, 2, 7, 14, 23 (c) 2, 4, 8, 16, 32
(d) 3, 8, 13, 18, 23 (e) -3, 0, 5, 12, 21 (f) 5, $\frac{5}{2}$, $\frac{5}{3}$, $\frac{5}{4}$, 1
(g) 12, -24, 48, -96, 192 (h) -1, 1, -1, 1, -1
(i) 4, 1, -2, -5, -8
4. (a) 38 (b) 96 (c) $\frac{10}{11}$
(d) 0 (e) 7 (f) 2
5. (a) $t_n = 4n - 1$ (b) $t_n = 6n + 30$ (c) $t_n = 4(3)^{n-1}$
(d) $t_n = \frac{2}{3^n}$ (e) $t_n = 5(-1)^{n+1}$ (f) $t_n = \sqrt{n}$
(g) $t_n = -4n + 69$ (h) $t_n = \frac{n+1}{n+2}$ (i) $t_n = \frac{1}{n^2}$
6. 4, 9, 8, 1, 0, ..., $t_{10} = 9$ 765 625, ...
7. (a) 2, 5, 8, 11, 14 (b) 81, 27, 9, 3, 1
(c) 2, 0, -2, -4, -6 (d) 2.4, 2.6, 2.8, 3, 3.2
(e) 1.5, 1, 0.75, 0.6, 0.5 (f) 3, 18, 45, 84, 135
8. (a) 7, 11, 16 (b) 56
(c) The difference between successive terms increases by 1.
9. (a) 1.414 213 562 4, 1.189 207 115, 1.090 507 732 7,
1.044 273 782 4, 1.021 897 148 7, 1.010 889 286 1,
1.005 429 901 1, 1.002 711 275 1, 1.001 354 719 9,
1.000 677 130 7
(b) The terms are approaching 1. (c) 1
10. The independent variable of a sequence uses only values from the set of natural numbers, so the points cannot be joined with a line or smooth curve.
11. (a) Example: {3, 6, 9, 12, 15, ...}, {3, 6, 3, 6, 3, ...},
{3, 6, 12, 24, 48, ...}, {3, 6, 10, 15, 21, ...}
(b) Example: increase by 3; add 3, subtract 3; double previous term; add one more than term
(c) Example: $t_n = t_{n-1} + 3$; $t_1 = 3$, $t_n = 9 - t_{n-1}$; $t_n = 2t_{n-1}$;
 $t_n = t_{n-1} + (n + 1)$
12. (a) $5n - 15$, -5, 10, 35 (b) n^4 , 16, 625, 10 000
(c) $\frac{5}{n}$, 2.5, 1, 0.5 (d) $(3n + 4)^2$, 100, 361, 1156
(e) 2^{n+1} , 8, 64, 2048 (f) $(-1)^{n+3}$, -1, 1, -1
(g) $\frac{n-1}{2n+2}$, $\frac{1}{6}$, $\frac{1}{3}$, $\frac{9}{22}$ (h) $3n^2 + 2n - 1$, 15, 84, 319
(i) $(n-1)^3$, 1, 64, 729
13. (a) finite (b) infinite (c) infinite
(d) infinite (e) finite
14. (a) \$1045, \$1090, \$1135 (b) $t_n = \$1000 + \$45n$
(c) \$1450
15. (a) {1, 8, 27, ...} (b) 64, 125, 216
(c) $t_n = n^3$ (d) 3375
16. (a) {10, 5, 2.5, 1.25, 0.625, ...} (b) $t_n = 20(0.5)^n$
(c) 0.0195 m
(d) The ball will stop bouncing eventually, so the sequence is finite. The sequence of numbers itself is infinite and the terms approach zero but will never reach it.
17. (a) {\$0.25, \$0.50, \$0.75, \$1.00, \$1.25, ...}
(b) $t_n = \$0.25n$ (c) \$13.00
18. (a) 98 (b) $t_n = 2n^2$
19. (a), (b) (Time, Bacteria): (1, 20), (2, 40), (3, 80), (4, 160),
(5, 320), (6, 640), (7, 1280), (8, 2560)
(c) $b_n = 10(2)^n$ (d) 10 240
20. 216, 492, 750
21. (a) {6, 16, 30, ...} (b) 48, 70, 96
(c) $t_n = 2n(n + 2)$ (d) 880
22. (a) {2, 8, 18, ...} (b) 32, 50, 72
(c) $t_n = 2n^2$ (d) 800
23. (a) 24, 40 (c) 220