Practise, Apply, Solve 1.7, page 57

1. **(a)** geometric, $r = 3$ **(b)** geometric, $r = -3$
(c) not geometric **(d)** geometric, $r = 4$
(e) not geometric **(f)** geometric, $r = \frac{1}{2}$

2. **(a)** geometric, $r = 3$ **(b)** not geometric
(c) not geometric **(d)** geometric, $r = 6$
(e) not geometric **(f)** geometric, $r = -1$

3. **(a)** $r = 5$, $t_n = 3(5)^{n-1}$, $t_8 = 234\,375$
(b) $r = 12$, $t_n = -12^n$, $t_8 = -429\,981\,696$
(c) $r = \frac{1}{2}$, $t_n = 4\left(\frac{1}{2}\right)^{n-1} = \frac{1}{2^{n-3}}$, $t_8 = 0.031\,25$
(d) $r = -2$, $t_n = 6(-2)^{n-1}$, $t_8 = -768$
(e) $r = 0.1$, $t_n = 0.2(0.1)^{n-1}$, $t_8 = 2 \times 10^{-8}$
(f) $r = 1$, $t_n = 5$, $t_8 = 5$

4. **(a)** $t_1 = 3$, $t_n = 5\,t_{n-1}$ **(b)** $t_1 = -12$, $t_n = 12\,t_{n-1}$
(c) $t_1 = 4$, $t_n = \frac{1}{2}t_{n-1}$ **(d)** $t_1 = 6$, $t_n = -2\,t_{n-1}$
(e) $t_1 = 0.2$, $t_n = 0.1\,t_{n-1}$ **(f)** $t_1 = 5$, $t_n = t_{n-1}$

5. **(a)** $t_n = 3(7)^{n-1}$ **(b)** $t_n = -4\left(\frac{-1}{4}\right)^{n-1} = (-1)^n 4^{-n+2}$
(c) $t_n = 125(-0.2)^{n-1} = (-1)^{n-1}5^{-n+4}$
(d) $t_n = -2(3)^n$

6. **(a)** arithmetic, $t_n = 10n + 20$ **(b)** geometric, $t_n = 4^n$
(c) neither **(d)** geometric, $t_n = 30\left(\frac{1}{5}\right)^{n-1}$
(e) arithmetic, $t_n = -15n + 160$ **(f)** neither

7. **i.** $t_n = 2^{n-1}$, $t_{10} = 512$
ii. $t_n = -40\left(\frac{1}{2}\right)^{n-1} = -5(2^{-n+4})$, $t_{10} = -\frac{5}{64}$
iii. $t_n = 4(-1)^{n+1}$, $t_{10} = -4$
iv. $t_n = 8\left(\frac{1}{2}\right)^{n-1} = 2^{-n+4}$, $t_{10} = \frac{1}{64}$

8. **(a)** dots of right side of upward parabola
(b) dots of curve going upward to right through (0, 0.2)
(c) dots of curve in first quadrant through (1, 5) and (3, 1.25)
(d) dots alternating above and below x-axis in increasing magnitude to right $(-1, 3)$, $(0, -6)$, $(2, 12)$, …
(e) dots in fourth quadrant curving up to right through $(-2, 4)$
(f) dots above x-axis curving up to right through (0, 1)
(g) dots above x-axis curving up to right through (1, 0.125)
(h) dots in third quadrant curving down to right through $(-1, -1)$

9. **(a)** $t_n = \left(-\frac{2}{3}\right)^{n-1}$ **(b)** $t_8 = -\frac{128}{2187}$

10. **(a)** \$28 500, \$25 080, \$22 070.40, \$19 421.95, \$17 091.32, \$15 040.36
(b) $t_n = \$28\,500\,(0.88)^{n-1}$ **(c)** \$10 249.58

11. **(a)** \$34 000, \$34 850, \$35 721.25, \$36 614.28, \$37 529.64
(b) $t_n = \$34\,000\,(1.025)^{n-1}$ **(c)** \$42 461.34

12. \$1006.10

13. 1.776×10^{-12} g

14. 81 920

15. **(a)** $t_n = (1.65 \times 10^9)(1.0135)^{n-1900}$ **(b)** 7.21×10^9

16. The value is multiplied by a factor of 0.75 each year.

17. **(a)** 1, 3, 9, 27 **(b)** 2187
(c) $3, \frac{9}{2}, \frac{27}{4}, \frac{81}{8}$ **(d)** 34.17 units

18. $t_1 = a$, $t_n = rt_{n-1}$

19. 11 a

20. **(a)** $a = -0.001\,28$, $r = 5$, $t_n = -0.00128(5)^{n-1}$
(b) $a = 4$, $r = 2$, $t_n = 2^{n+1}$; $a = -4$, $r = -2$, $t_n = (-1)^n(2)^{n+1}$
(c) $a = 2$, $r = 3$, $t_n = 2(3)^{n-1}$

21. **(a)** $t_n = 4(7)^{n-1}$, $t_{10} = 161\,414\,428$
(b) $t_1 = 108$, $t_2 = 36$, multiply by $\frac{1}{3}$ to get next term

22. *Example:* {5, 5, 5, ...}

23. 35.44 units^2

24. $(a, b) = (1, -6)$ or $(a, b) = (16, 24)$

25. $\frac{-b^8}{a^7}$