

5. (a)  $I = \frac{d}{n}$  6. (a) 0.10 (b)  $\lambda = \lambda_0 \times 10^{-kx}$  (c) 16.82% (d)  $k = -\frac{1}{x} \log\left(\frac{\lambda}{\lambda_0}\right)$

**EXERCISE 8.1.1**

1. i. (b) 4 (c)  $t_n = 4n - 2$  ii. (b)  $-3$  (c)  $t_n = -3n + 23$  iii. (b)  $-5$  (c)  $t_n = -5n + 6$  iv. (b) 0.5  
 (c)  $t_n = 0.5n$  v. (b) 2 (c)  $t_n = y + 2n - 1$  vi. (b)  $-2$  (c)  $t_n = x - 2n + 4$  2.  $-28$  3. 9, 17 4.  $-43$   
 5. 7 6. 7 7.  $-5$  8. 0 9. (a) 41 (b) 31st 10. 10, 2,  $\sqrt{3}$  11. (a) i, 2 ii.  $-3$  (b) i, 4 ii. 11  
 12.  $x - 8y$  13.  $t_n = 5 + \frac{3}{2}(n - 1)$  14. (a)  $-1$  (b) 0

**EXERCISE 8.1.2**

1. (a) 145 (b) 300 (c) 170 2. (a)  $-18$  (b) 690 (c) 70 4 3. (a)  $-105$  (b) 507 (c) 224 4. (a) 126  
 (b) 3900 (c) 14th week 5. 855 4. (a) 420 (b)  $-210$  7.  $a = 9, b = 7$

**EXERCISE 8.1.3**

1. 123 2.  $-3, -0.5, 2, 4.5, 7, 9.5, 12$  3. 3.25 4.  $a = d = -0.05$  5. 10 000 6. 330 7.  $-20$   
 8. 328 9. \$725, 37wks 10. i. \$55 ii. 2750 11. (a) (i) 8m (ii) 40m (b) 84m  
 (c) Dist =  $2n^2 - 2n = 2n(n - 1)$  (d) 8 (e) 26 players, 1300m 12. (a) 5050 (b) 10200 (c) 4233  
 13. (a) 145 (b) 390 (c)  $-1845$  14. (b)  $3n - 2$

**EXERCISE 8.2.1**

1. (a)  $r = 2, u_5 = 48, u_n = 3 \times 2^{n-1}$  (b)  $r = \frac{1}{3}, u_5 = \frac{1}{27}, u_n = 3 \times \left(\frac{1}{3}\right)^{n-1}$   
 (c)  $r = \frac{1}{5}, u_5 = \frac{2}{625}, u_n = 2 \times \left(\frac{1}{5}\right)^{n-1}$  (d)  $r = -4, u_5 = -256, u_n = -1 \times (-4)^{n-1}$   
 (e)  $r = \frac{1}{b}, u_5 = \frac{a}{b^5}, u_n = ab \times \left(\frac{1}{b}\right)^{n-1}$  (f)  $r = \frac{b}{a}, u_5 = \frac{b^5}{a^5}, u_n = a^2 \times \left(\frac{b}{a}\right)^{n-1}$  2. (a)  $\pm 12$   
 (b)  $\frac{\pm\sqrt{5}}{2}$  3. (a)  $\pm 96$  (b) 15th 4. (a)  $u_n = 10 \times \left(\frac{5}{6}\right)^{n-1}$  (b)  $\frac{15625}{3888} \equiv 4.02$  (c)  $n = 5$  (4 times)  
 5.  $-2, \frac{4}{3}$  6. (a) i. \$4096 ii. \$2097.15 (b) 6.2 yrs 7.  $\left(u_n = \frac{1000}{169} \times \left(\frac{12}{5}\right)^{n-1}\right), \frac{1990656}{4225} \equiv 471.16$   
 8. 2.5, 5.10 or 10, 5, 2.5 9. 53757 10. 108 952 11. (a) \$56 156 (b) \$299 284

**EXERCISE 8.2.2**

1. (a) 3 (b)  $\frac{1}{3}$  (c)  $-1$  (d)  $-\frac{1}{3}$  (e) 1.25 (f)  $\frac{2}{3}$  2. (a) 216513 (b) 1.6384  $\times 10^{-10}$  (c)  $\frac{256}{729}$   
 (d)  $\frac{729}{2401}$  (e)  $\frac{81}{1024}$  3. (a) 11; 354292 (b) 7; 473 (c) 8; 90,90909 (d) 8; 172,778 (e) 5; 2.256  
 (f) 13; 1111111111 4. (a)  $\frac{127}{128}$  (b)  $\frac{63}{81}$  (c)  $\frac{130}{81}$  (d) 60 (e)  $\frac{63}{64}$  5. 4; 118096 6. \$2109.50  
 7. 9.28cm 8.  $V_n = V_0 \times 0.7^{n-1}, 7.54$  9. 40, 53.5gms; 50 weeks, 11.7 12. 9 13.  $-0.5$   
 14.  $r = 5, 1.8 \times 10^{10}$  15. \$8407.35 16.  $1.8 \times 10^{10}$ , or about 200 billion tonnes.

**EXERCISE 8.2.3**

1. Term 9 AP = 180, GP = 256. Sum to 11 terms AP = 1650, GP = 2047. 2. 18. 3. 12 4. 4.4  
 5. 8 weeks (Ken \$220 & Bo-Youn \$255) 6. (a) week 8 (b) week 12 7. (a) 1.618 (b) 121379  
 [ $\approx 121400$ , depends on rounding errors]

**EXERCISE 8.2.4**

1. (i)  $\frac{81}{2}$  (ii)  $\frac{10}{13}$  (iii) 5000 (iv)  $\frac{30}{11}$  2.  $23 \frac{23}{99}$  3. 6667 fish. [Nb:  $t_3 < 1$ . If we use  $n = 43$  then  
 ans is 6660 fish]; 20 000 fish. Overfishing means that fewer fish are caught in the long run. 4. 27  
 5. 48, 12.3 or 16, 12.9 6. (a)  $\frac{11}{30}$  (b)  $\frac{37}{99}$  (c)  $\frac{191}{90}$  7. 128 cm 8.  $\frac{121}{9}, 2 + \frac{4}{3}, \sqrt{3}, 10, \frac{1 - (-1)^n}{1 + 1}$   
 $\frac{1}{1 + r}, \frac{1 - (-1)^n}{1 + r^2}, \frac{1}{1 + r^2}$

**EXERCISE 8.2.5**

1. 3,  $-0.2$  2.  $\frac{2560}{93}$  3.  $\frac{10}{3}$  4.  $\frac{43, 458, 413}{18, 99, 990}$  5. 9900 6. 3275 7. 3 8.  $t_n = 6n - 14$   
 9. 6 10.  $-\frac{1}{6}$  11. i. 12 ii. 26 12. 9, 12 13. 2 14. (5, 5, 5), (5,  $-10, 20$ )  
 15. (a) 2, 7 (b) 2, 5, 8 (c)  $3n - 1$  16. (a) 5 (b) 2 m

**EXERCISE 8.3**

1. \$2773.08 2. \$4377.63 3. \$1781.94 4. \$12216 5. \$35816.95 6. \$40349.37 7. \$64006.80  
 8. \$276971.93, \$281325.41 9. \$63762.25 10. \$98.62, \$9467.14, interest \$4468.14.  
 Flat interest = \$6000 11. \$134.41, \$3790.38, 0.602%/month (or 7.22% p.a.)

**EXERCISE 9.1**

	a cm	b cm	c cm	A	B	C
1.	3.8	4.1	1.6	67°	90°	23°
2.	81.5	98.3	55.0	56°	90°	34°
3.	32.7	47.1	33.9	44°	90°	46°
4.	1.61	30.7	30.7	3°	90°	87°
5.	2.3	2.74	1.49	57°	90°	33°
6.	48.5	77	59.8	39°	90°	51°
7.	44.4	81.6	68.4	33°	90°	57°
8.	2.93	13.0	12.7	13°	90°	77°
9.	74.4	94.4	58.1	52°	90°	38°
10.	71.8	96.5	64.6	48°	90°	42°
11.	23.3	34.1	24.9	43°	90°	47°
12.	43.1	43.2	2.3	87°	90°	3°
13.	71.5	80.2	36.4	63°	90°	27°
14.	33.5	34.1	6.5	79°	90°	11°
15.	6.1	7.2	3.82	58°	90°	32°
16.	29.1	30	7.3	76°	90°	14°
17.	29.0	29.1	2.0	86°	90°	4°
18.	34.5	88.2	81.2	23°	90°	67°
19.	24.0	29.7	17.5	54°	90°	36°
20.	41.2	46.2	21.0	63°	90°	27°
21.	59.6	72.9	41.8	55°	90°	35°
22.	5.43	6.8	4.09	53°	90°	37°