

ALGEBRA II

Chapter 1

Sequences

REFRESH YOUR SKILLS

1a) Difference = 20

Ratio = 1.2

1b) Difference = 3

Ratio \approx 1.06

1c) Difference = -60

Ratio = 0.70

1d) Difference = -3

Ratio = 0.75

2a) *iv*

2b) *iii*

2c) *i*

2d) *ii*

3a) $20(1 + 0.15) = 23$

3b) $60(1 + 0.20) = 72$

3c) $300(1 - 0.18) = 246$

3d) $40(1 - 0.30) = 28$

3e) $110 + 20 = 130$

3f) $250 - 40 = 210$

4) \$24,300

5) \$258

6a) add 2

6b) Multiply by 3



SECTION 1.1A RECURSIVELY DEFINED SEQUENCES

1a) *iv*

1b) *ii*

1c) *i*

1d) *iii*

2a) $-18, -13.7, -9.4, -5.1$

arithmetic; $d = 4.3$

2b) $47, 44, 41, 38$

arithmetic; $d = -3$

2c) $20, 26, 32, 38$

arithmetic; $d = 6$

2d) $32, 48, 72, 108$

geometric; $r = 1.5$


$$3) \begin{cases} u_1 = 40 \\ u_n = u_{n-1} - 3.45; n \geq 2 \\ u_5 = 26.2; u_9 = 12.4 \end{cases}$$

$$4) \begin{cases} u_1 = 6 \\ u_n = u_{n-1} + 3.2; n \geq 2 \end{cases}; u_{10} = 34.8$$

$$5a) \begin{cases} u_1 = 2 \\ u_n = u_{n-1} + 4; n \geq 2 \end{cases}; u_{15} = 58$$

$$5b) \begin{cases} u_1 = 0.4 \\ u_n = 0.1u_{n-1}; n \geq 2 \end{cases}; u_{10} = 0.0000000004$$

$$5c) \begin{cases} u_1 = -2 \\ u_n = u_{n-1} - 6; n \geq 2 \end{cases}; u_{30} = -176$$

$$5d) \begin{cases} u_1 = -6.24 \\ u_n = u_{n-1} + 2.21; n \geq 2 \end{cases}; u_{20} = 35.75$$


SECTION 1.1B RECURSIVELY DEFINED SEQUENCES

$$6) \begin{cases} u_1 = 4 \\ u_n = u_{n-1} + 5; n \geq 2 \end{cases}; u_{46} = 229$$

$$7) \begin{cases} u_1 = 4 \\ u_n = u_{n-1} + 6; n \geq 2 \end{cases}$$

Figure	1	2	3	4	5	...	12	...	32
Segments	4	10	16	22	28	...	70	...	190

9a) 399 km

9b) 10 hr after first car starts, or 8 hr after the second car starts

11a) \$60

11b) \$33.75

11c) during the ninth week

$$13a) 3.2; \frac{51-35}{5} = 3.2$$

13b) 25.4, 28.6, 31.8, ..., 38.2, 41.4, 44.6, 47.8, ..., 54.2 13c) 172.6



SECTION 1.2A MODELING GROWTH AND DECAY

1a) 1.5; growth; 50% increase

1b) 0.4; decay; 60% decrease

1c) 1.03; growth; 3% increase

1d) 0.92; decay; 8% decrease

$$2a) \begin{cases} u_0 = 100 \\ u_n = 1.5u_{n-1}; n \geq 1 \end{cases}; u_{10} \approx 5766.5$$

$$2b) \begin{cases} u_0 = 73.4375 \\ u_n = 0.4u_{n-1}; n \geq 1 \end{cases}; u_{10} \approx 0.0077$$

$$2c) \begin{cases} u_0 = 80.00 \\ u_n = 1.03u_{n-1}; n \geq 1 \end{cases}; u_{10} \approx 107.513$$

$$2d) \begin{cases} u_0 = 208.00 \\ u_n = 0.92u_{n-1}; n \geq 1 \end{cases}; u_{10} \approx 90.35$$

3a) 2000, 2100, 2205, 2315.25

3b) 5000, 4250, 3612.5, 3070.625

common ratio = 0.85

$$3c) \begin{cases} a_0 = 100 \\ a_n = u_{n-1}(1 + 0.08); n \geq 1 \end{cases}$$

4a) ii. decay

4b) i. growth

4c) iii. constant

5a) $x(1 + A)$

5b) $(1 - 0.18)A$ or $0.82A$

5c) $(1 + 0.08125)x$ or $1.08125x$

5d) $(2 - 0.85)u_{n-1}$ or $1.15u_{n-1}$

SECTION 1.2B MODELING GROWTH AND DECAY

6a) 0.8

6b) 11 in

6c) 21 bounces; 31 bounces

8) \$250,000 was invested at 2.5% annual interest in 2008

$$u_{2012} \approx \$275.953.22$$

9a) next 5 years: 2, 3, 3 (or 4), 4, and 5

9b) about 30 employees

$$12a) \frac{65}{120} \approx 0.542\% \quad 12b) \$502.71 \quad 12c) \$533.49 \quad 12d) \$584.80$$

$$19a) \begin{cases} u_1 = 180 \\ u_n = u_{n-1} - 7; n \geq 2 \end{cases}$$

$$19b) u_{10} = 117$$

$$19c) u_{27} = -2$$

$$20a) x \approx 43.34$$

$$20b) x = -681.5$$

$$20c) x \approx 0.853$$

$$20d) x = 8$$

SECTION 1.3A A FIRST LOOK AT LIMITS

1a) 31.2, 45.64, 59.358; shifted geometric, increasing

1b) 776, 753.2, 731.54; shifted geometric, decreasing

1c) 45, 40.5, 36.45; geometric, decreasing

1d) 40, 40, 40; shifted geometric, neither

2a) $a = 840$ 2b) $b = 1200$ 2c) $d = 0$ 2d) *no solution*

3a) 320 3b) 320 3c) 0 3d) 40

$$4a) \begin{cases} u_0 = 200 \\ u_n = 1.08u_{n-1}; n \geq 1 \end{cases}$$

$$4b) \begin{cases} u_0 = 0 \\ u_n = 0.5u_{n-1} + 10; n \geq 1 \end{cases}$$

$$4c) \begin{cases} u_0 = 400 \\ u_n = (1 + 0.05)u_{n-1} - 20; n \geq 1 \end{cases}$$



SECTION 1.3B A FIRST LOOK AT LIMITS

5a) The first day, 300 g of chlorine were added. Each day, 15% disappears, and 30 g are added.

5b) It levels off at 200g.

6a) 24,035.91; 24,003.73; 23,903.73

$$6b) \begin{cases} a_0 = 24,000 \\ a_n = \left(1 + \frac{0.034}{12}\right) a_{n-1} - 100 \end{cases}$$

6c) \$23,871.45,

This is the balance on 2/2/09

6d) \$23,609.96; \$22,789.00

8a) 5557 trees

8b) 5000 trees. Number of trees sold will be exactly equal to the number planted

8c) $c = 0.88c + 600$

8d) No change

8e) No change

$$9) \begin{cases} u_0 = 20 \\ u_n = (1 - 0.25)u_{n-1} \end{cases}$$

11 days, $u_{11} \approx 0.84 \text{ mg}$



SECTION 1.4A GRAPHING SEQUENCES

1a) 0 to 9 for n and 0 to 16 for u_n

1b) 0 to 19 for n and 0 to 400 for u_n

1c) 0 to 29 for n and -178 to 25 for u_n

1d) 0 to 69 for n and 0 to 3037 for u_n

2a) *ii, geometric*

2b) *iv, arithmetic*

2c) *i, arithmetic*

2d) *iii, geometric*

3a) geometric, nonlinear, decreasing

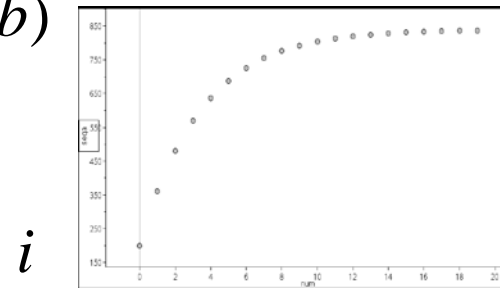
3b) arithmetic, linear, decreasing

3c) geometric, nonlinear, increasing

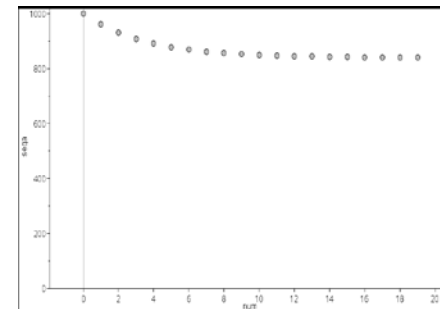
3d) arithmetic, linear, increasing

4a) 840

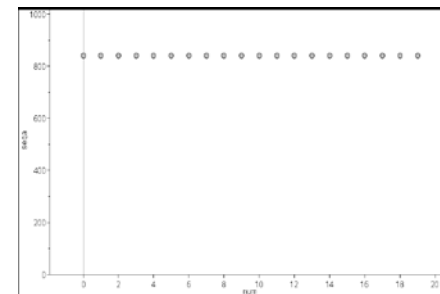
4b)



ii



iii

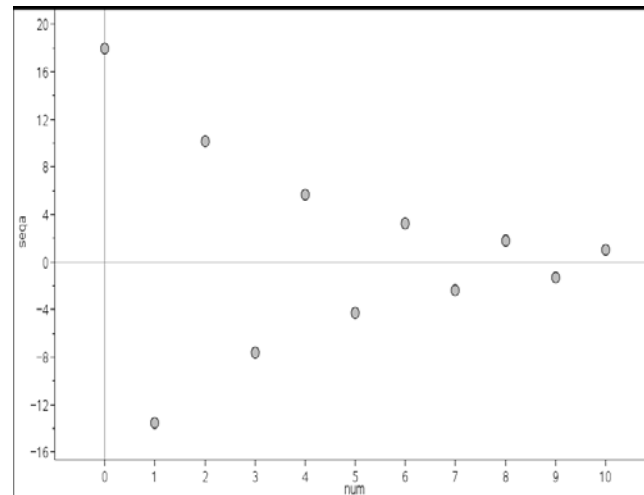


SECTION 1.4B GRAPHING SEQUENCES

- 5a) The graph has a nonzero limit, so it must represent a shifted geometric sequence.
- 5b) The graph of a nonshifted geometric sequence will increase indefinitely or have a limit of 0
- 5c) The graph of an arithmetic sequence is linear.

$$6a) \begin{cases} u_0 = 18 \\ u_n = -0.75u_{n-1} \end{cases}$$

6b)



6c) 0

$$11) \text{ possible: } \begin{cases} u_{50} = 40 \\ u_n = u_{n-1} + 4 \end{cases}$$



SECTION 1.5A LOANS AND INVESTMENTS

1a) Investment, a deposit is added

1b) \$450 1c) \$50 1d) 3.9% 1e) annually (once a year)

2a) Loan, a payment is subtracted

2b) \$500 2c) \$25 2d) 4% 2e) quarterly (four times a year)

3a) \$130.67 3b) \$157.33 3c) \$184.00 3d) \$210.67

$$4a) \begin{cases} u_0 = 10,000 \\ u_n = u_{n-1} \left(1 + \frac{0.10}{12} \right) - 300 \end{cases}$$

$$4b) \begin{cases} u_0 = 7,000 \\ u_n = u_{n-1} \left(1 + \frac{0.1875}{12} \right) - 250 \end{cases}$$

$$4c) \begin{cases} u_0 = 8,000 \\ u_n = u_{n-1} \left(1 + \frac{0.06}{4} \right) + 500 \end{cases}$$

$$4d) \begin{cases} u_0 = 0 \\ u_n = u_{n-1} \left(1 + \frac{0.07}{12} \right) + 100 \end{cases}$$



SECTION 1.5B LOANS AND INVESTMENTS

5) \$588.09 6a) \$1,905.56 6b) \$3,635.15 6c) \$6,919.38

8a) Both deposit \$1,000 to start and \$1,200 each year.

There is no difference

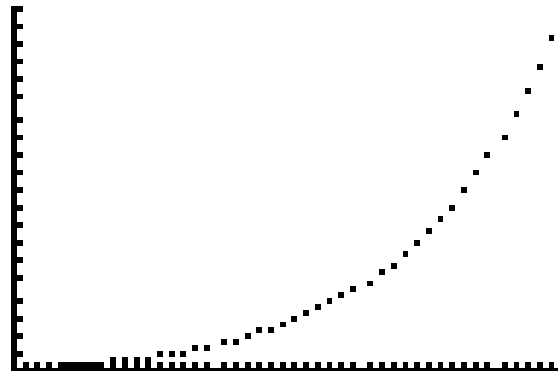
8b) Shaleah's account always has a higher balance.

The difference gets greater over time.

Year	0	1	2	3	...
Beau	\$1,000.00	\$2,265.00	\$3,612.23	5,047.02	...
Shaleah	\$1,000.00	\$2,303.38	\$3,694.04	\$5,177.84	...

9a) \$123.98

9b)



15a) 30.48 cm

15b) 320 km

15c) 129.64 m

