

Unit 6 – Lesson 6.1 Homework

Pg. 360 #1abdef, 3adegi, 4, 8, 13ace

1. Write the first three terms of each sequence, given the explicit formula for the n th term of the sequence.

a) $t_n = 3n - 1$ b) $t_n = 2 - 5n$
c) $t_n = 3^{n-1}$ d) $f(n) = 2^{-n}$
e) $t_n = \frac{n+1}{n} - 1$ f) $f(n) = 3(2)^{n+2}$

3. Describe the pattern in each sequence. Write the next three terms of each sequence.

a) 4, 16, 64, 256, ...
b) 7, 6, 5, 4, ...
c) -3, -6, -9, -12, ...
d) 100, 10, 1, 0.1, ...
e) 5, -10, 15, -20, ...
f) $\frac{1}{3}, \frac{1}{9}, \frac{1}{27}, \frac{1}{81}, \dots$
g) $x, 3x, 5x, 7x, \dots$
h) 4, 8, 12, 16, ...
i) a, ar, ar^2, ar^3, \dots
j) 0.2, -0.4, 0.6, -0.8, ...

4. For each sequence, make a table of values using the term number and term and calculate the finite differences. Then, determine an explicit formula in function notation and specify the domain.

a) 2, 4, 6, 8, ...
b) 2, 1, 0, -1, ...
c) 3, 6, 9, 12, ...
d) 0, 3, 8, 15, ...
e) 3, 6, 11, 18, ...
f) -10, -9, 0, 17, ...

8. Consider the sequence 7, 14, 21, 28, ... Determine whether or not each of the following numbers is part of this sequence. Explain your thinking.

a) 98 b) 110 c) 378 d) 575

13. Determine an explicit formula for the n th term of each sequence. Use the formula to write the 15th term.

a) -4, 8, -16, 32, ... b) $1, \frac{2}{3}, \frac{3}{5}, \frac{4}{7}, \dots$
c) $1, \sqrt{2}, \sqrt{3}, 2, \dots$ d) 1, 2, 4, 8, ...
e) $1, \frac{1}{2}, \frac{1}{3}, \frac{1}{4}, \dots$ f) 1, -1, 1, -1, ...

Pg. 370 #1abde, 2ac, 3, 8af

1. Write the first four terms of each sequence, where $n \in \mathbb{N}$.

a) $t_1 = 4, t_n = t_{n-1} + 3$
b) $t_1 = 7, t_n = 2t_{n-1} - 1$
c) $t_1 = -3, t_n = 0.2t_{n-1} - 1.2$
d) $t_1 = 50, t_n = \frac{t_{n-1}}{2}$
e) $t_1 = 8, t_n = 2n - 3t_{n-1}$
f) $t_1 = 100, t_n = \frac{5t_{n-1}}{0.1}$

2. Write the first four terms of each sequence, where $n \in \mathbb{N}$.

a) $f(1) = 9, f(n) = f(n-1) - 2$
b) $f(1) = -1, f(n) = -3f(n-1)$
c) $f(1) = 3, f(n) = \frac{f(n-1)}{n}$
d) $f(1) = 18, f(n) = f(n-1) + 2$
e) $f(1) = 0.5, f(n) = -f(n-1)$
f) $f(1) = 25, f(n) = -0.5f(n-1)$

3. Determine a recursion formula for each sequence.
- 5, 11, 17, 23, ...
 - 4, 1, -2, -5, ...
 - 4, 8, 16, 32, ...
 - 4, -2, -1, $-\frac{1}{2}$, ...
 - 5, 15, -45, 135, ...
8. Write the first four terms of each sequence.
- $t_1 = 1, t_n = (t_{n-1})^2 + 3n$
 - $f(1) = 8, f(n) = \frac{f(n-1)}{2}$
 - $t_1 = 3, t_n = 2t_{n-1}$
 - $t_1 = -5, t_n = 4 - 2t_{n-1}$
 - $t_1 = \frac{1}{2}, t_n = 4t_{n-1} + 2$
 - $f(1) = a + 3b, f(n) = f(n-1) + 4b$

Answers

6.1 Sequences as Discrete Functions, pages 360–363

- 2, 5, 8
 - 3, -8, -13
 - 1, 3, 9
 - $\frac{1}{2}, \frac{1}{4}, \frac{1}{8}$
 - $1, \frac{1}{2}, \frac{1}{3}$
 - 24, 48, 96
- Answers may vary. Sample answers:
 - The first term is 4. Multiply each term by 4 to get the next term.
next three terms: 1024, 4096, 16 384
 - The first term is 100. Divide each term by 10 to get the next term.
next three terms: 0.01, 0.001, 0.0001
 - The first term is 5. To get each subsequent term in the sequence, increase the absolute value of the previous term by 5 and then multiply the result by $(-1)^{n+1}$.
next three terms: 25, -30, 35
 - The first term is x . Add $2x$ to each term to get the next term.
next three terms: $9x, 11x, 13x$
 - The first term is a . Multiply each term by r to get the next term.
next three terms: ar^4, ar^5, ar^6
- Answers may vary. Sample answers: Each term in the sequence is a multiple of 7.
 - 98 is a part of this sequence. 98 is a multiple of 7.
 - 110 is not a part of this sequence. 110 is not a multiple of 7.
 - 378 is a part of this sequence. 378 is a multiple of 7.
 - 575 is not a part of this sequence. 575 is not a multiple of 7.

13. Answers may vary. Sample answers:

- $f(n) = (-4)(-2)^{n-1}; -65\ 536$
- $f(n) = \frac{n}{2n-1}; \frac{15}{29}$
- $f(n) = \sqrt{n}; \sqrt{15}$

6.2 Recursive Procedures, pages 370–372

- 4, 7, 10, 13
 - 7, 13, 25, 49
 - 3, -1.8, -1.56, -1.512
 - 50, 25, 12.5, 6.25
 - 8, -20, 66, -190
- 9, 7, 5, 3
 - $3, \frac{3}{2}, \frac{1}{2}, \frac{1}{8}$
- $t_1 = 5, t_n = t_{n-1} + 6$
 - $t_1 = 4, t_n = t_{n-1} - 3$
 - $t_1 = 4, t_n = 2t_{n-1}$
 - $t_1 = -4, t_n = \frac{1}{2}t_{n-1}$
 - $t_1 = -5, t_n = -3t_{n-1}$
- 1, 7, 58, 3376
 - $a + 3b, a + 7b, a + 11b, a + 15b$