

Math 110 – Chapter 8 – Worksheet 1 – Version A

Sequences and Series; Arithmetic Sequence; Partial Sums

8.1 Sequences and Series

1. Write the first four terms of the sequence with general term $a_n = -2^n$
2. Graph the first four terms of the sequence and corresponding function on the Cartesian plane

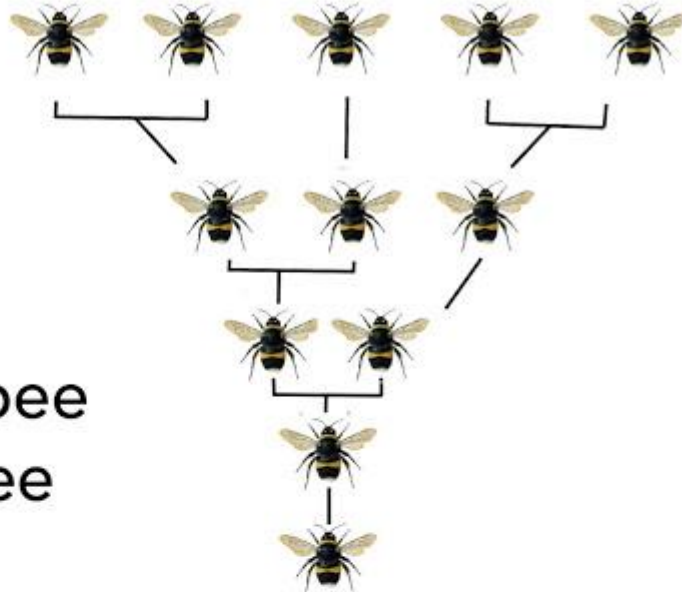
$$a_n = 1 + \left(\frac{1}{2}\right)^n$$

3. Write the general term of the sequence whose first five terms are $0, -\frac{1}{2}, \frac{2}{3}, -\frac{3}{4}, \frac{4}{5}, \dots$
4. Write the first five terms of the recursively defined sequence $a_1 = -3; a_{n+1} = 2a_n + 5$
5. Find the sequence that accurately counts the ancestors of a female honeybee. (see the explanation at the end of this worksheet.)
6. Simplify the factorials: (a) $\frac{20!}{18!}$ (b) $\frac{n!}{(n-3)!}$
7. Find the first five terms of the sequence whose general term is: $a_n = \frac{(-1)^n(2)^n}{n!}$
8. Find the sum: $\sum_{k=0}^3 (-1)^k k!$
9. Write the following in summation notation (sigma notation): $2 - 4 + 6 - 8 + 10 - 12 + 14$

8.2 Arithmetic Sequences; Partial Sums

10. Find the common difference of the arithmetic sequence: $3, -2, -7, -12, -17 \dots$
11. Find the expression for the n th term of the arithmetic sequence: $-3, 1, 5, 9, 13, 17, \dots$
12. Graph the arithmetic sequence $7, 4, 1, -2, -5, \dots$ then use the graph to find an expression for the n th term.
13. Find the common difference and the n th term a_n of the arithmetic sequence whose 4th term is 41 and 15th term is 8.
14. Find the sum of the arithmetic series $\frac{2}{3} + \frac{5}{6} + 1 + \frac{7}{6} + \frac{4}{3} + \frac{3}{2} + \frac{5}{3} + \frac{11}{6} + 2 + \frac{13}{6}$ using the sum formula for an arithmetic sequence.

A Honeybee Family Tree



Honeybees reproduce according to the following rules:

- If an egg is laid by an unmated female, it hatches a male bee.
- If an egg was fertilized by a male, it hatches a female.

Question 1: Label the bees in the diagram above as F (female) or M (male).

Question 2: Draw in more generations of bees above the top row and label those too.

Question 3: Study the pattern and see what you notice. Keep track of how many bees are in each generation. Keep track of how many males and females are in each generation.