

CS1800

Fall 2025

Recitation 9 - Practice Questions for Homework 6

November 5 & 6, 2025

Recitations

CS1802 Recitations are dedicated time set aside to work on practice problems that specifically prepare you for the current homework or upcoming quiz.

Recitations are in-person and attendance is expected.

The solutions are published at the same time as the problems, so you can check your work. There is no need to submit anything.

Approaching the Problems

These practice problems are labelled according to which Homework or Quiz topic they will help you prepare for. You do not need to complete every practice question; we encourage you to do at least one per topic, and to prioritize the topics you would like to practice.

Instructors & Teaching Assistants

Your recitation is led by a Khoury College professor, assisted by a knowledgeable and wonderful Teaching Assistant. Professors and TAs are fantastic resources, and you have the opportunity in recitation to work with them in a smaller group -- I strongly recommend you take advantage of the time to review your solutions to these practice problems, ask for help on the homework, or review material from lecture.

Practice Problems for Sequence Types & Formulas (HW6, Q1)
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For each sequence below, do the following:

- Identify the sequence type (arithmetic, geometric, quadratic, or none of the above)
- If applicable, find a closed-form formula for a_k , the k th term (assume we count from one so the first term would be a_1)

A $-28, -22, -16, -10, \dots$

B $5, -7, -12, -19, \dots$

C $5, -7, -19, -31, \dots$

D 4, 20, 100, 500 ...

E 6, 11, 18, 27, 38, 51,

Practice Problems for Term of the Sequence (HW6, Question 2)

What is the term a_3 of the sequence $\{a_n\}$, where a_k equals...

A $2^k + 1$

B $(k + 1)^{k+1}$

C $[k/2]$

D $[k/2] + [k/2]$

Consider these initial terms of a sequence: $a_1 = 1$, $a_2 = 4$, $a_3 = 9$, $a_4 = 16 \dots$

E Each term is actually the value of a summation, because:

$$a_1 = 1$$

$$a_2 = 1 + 3 = 4$$

$$a_3 = 1 + 3 + 5 = 9$$

$$a_4 = 1 + 3 + 5 + 7 = 16$$

...

Let's generalize this idea. For a given a_k , fill in the summation formula:

$$a_k = \sum_{i=1}^k [??]$$

F For the sequence in part E, we can express an arbitrary term a_k **recursively**, by referring to previous term(s). Come up with a recursive formula for a_k .

Practice Problems for Summations (HW6, Question 3)

A Give a formula, simplified as much as possible, for the sum of the first n terms of the sequence 5, 7, 9, 11, 13, ...

B What is the sum of the first 20 values of the sequence beginning with $-28, -22, -16, -10, \dots$?

C What is the sum of the first 10 values of the sequence beginning with 4, 20, 100, 500, ... ?

Practice Problems for Combining Summations (HW6, Question 4)

A Write the expression $3 + 6 + 9 + 12 + \cdots + 60$ in sigma notation

Recall that the sum of the first n positive integers is $\sum_{i=1}^n i = \frac{(n)(n+1)}{2}$

We recommend applying it to solve the problems below!

B Find $\sum_{i=2}^n i$

C Find $\sum_{i=1}^{n-1} i$

D Find $\sum_{i=1}^n (i - 1)$

E Find $\sum_{i=50}^n i$. Simplify your expression as much as possible.

Practice Problems for Sequences in Real Life (HW6, Question 5)

Daniel loses a bet to Laney and owes her \$50,000. She sets terms on the money, though, just in case Daniel is a deadbeat who refuses to pay up. He owes \$50,000 in month one. But in month two, she demands to be paid \$56,000. Month three it's \$62,720 and month four it's \$70,246.40.

A Identify the type of sequence Laney is using (arithmetic, geometric, or quadratic). Use the formula for that type to determine a closed-form formula for the amount Daniel will owe Laney in month k .

B Use your formula to determine how much Daniel will owe Laney in month 12.