SEQUENCES

A NUMERICAL SEQUENCE

A.1 FINDING u_n

Ex 1:

n	1	2	3	4	5	6
u_n	3	5	7	9	11	13

What is u_4?

$\square$

Ex 2:

n	1	2	3	4	5	6
u_n	2	6	12	20	30	42

What is u_5?

$\square$

Ex 3:

n	1	2	3	4	5	6	7	8
u_n	4	9	16	25	36	49	64	81

What is u_7?

$\square$

Ex 4:

n	1	2	3	4	5	6	7	8
u_n	1	3	7	15	31	63	127	255

What is u_8?

$\square$

A.2 FINDING u_n IN AN ARITHMETIC SEQUENCE

Ex 5: What is u_6 for this sequence?

n	1	2	3	4	5	6
u_n	3	5	7	9	11	$\square$

Ex 6: What is u_6 for this sequence?

n	1	2	3	4	5	6
u_n	3	8	13	18	23	$\square$

Ex 7: What is u_5 for this sequence?

n	1	2	3	4	5
u_n	20	18	16	14	$\square$

Ex 8: What is u_6 for this sequence?

n	1	2	3	4	5	6
u_n	80	70	60	50	40	$\square$

B DEFINITION USING A RECURSIVE RULE

B.1 CALCULATING THE FIRST TERMS

Ex 9: Write the sequence defined by: the first term is 7, and each term is obtained by adding 4 to the previous term.

($\square$, $\square$, $\square$, $\square$, $\square$, ...)

Ex 10: Write the sequence defined by: the first term is 1, and each term is obtained by multiplying the previous term by 2.

($\square$, $\square$, $\square$, $\square$, $\square$, ...)

Ex 11: Write the sequence defined by: the first term is 10, and each term is obtained by subtracting 5 from the previous term.

($\square$, $\square$, $\square$, $\square$, $\square$, ...)

Ex 12: Write the sequence defined by: the first term is 2.5, and each term is obtained by adding 0.5 to the previous term.

($\square$, $\square$, $\square$, $\square$, $\square$, ...)

B.2 IDENTIFYING THE RECURSIVE RULE

Ex 13: Given the sequence: (3, 5, 7, 9, 11, 13, ...)

- The first term is $\square$.
- The rule is
  - ☐ Add
  - ☐ Subtract
  - ☐ Multiply
  - ☐ Divide

  $\square$

Ex 14: Given the sequence: (60, 55, 50, 45, 40, 35, ...)

- The first term is $\square$.
- The rule is
  - ☐ Add
  - ☐ Subtract
  - ☐ Multiply
  - ☐ Divide

  $\square$

Ex 15: Given the sequence: (64, 32, 16, 8, 4, 2, ...)

- The first term is $\square$.
- The rule is
  - ☐ Add
  - ☐ Subtract
  - ☐ Multiply
  - ☐ Divide

  $\square$

Ex 16: Given the sequence: (1, 10, 100, 1 000, 10 000, ...)

- The first term is $\square$.
- The rule is
  - ☐ Add
  - ☐ Subtract
  - ☐ Multiply
  - ☐ Divide

  $\square$

B.3 IDENTIFYING THE RECURSIVE RULE IN GEOMETRIC PATTERNS

Ex 17: Observe the following pattern made with sticks:

Fill in the table below:

Diagram number	1	2	3	4
Number of sticks				

What rule can you find for the number of sticks?
Start with ☐ sticks. Add ☐ sticks for the next diagram.

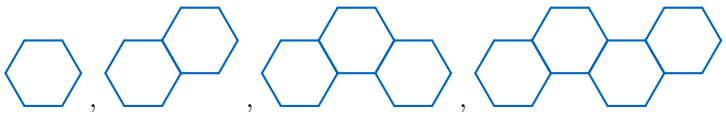
Ex 18: Observe the following pattern made with sticks:

Fill in the table below:

Diagram number	1	2	3	4
Number of sticks				

What rule can you find for the number of sticks?
Start with ☐ sticks. Add ☐ sticks for the next diagram.

Ex 19: Observe the following pattern made with sticks:



Fill in the table below:

Diagram number	1	2	3	4
Number of sticks				

What rule can you find for the number of sticks?
Start with ☐ sticks. Add ☐ sticks for the next diagram.

Ex 20: Observe the following pattern made with sticks:

Fill in the table below:

Diagram number	1	2	3	4
Number of sticks				

What rule can you find for the number of sticks?
Start with ☐ sticks. Add ☐ sticks for the next diagram.

B.4 MODELING REAL SITUATIONS WITH SEQUENCES

Ex 21: A scientist observes a culture of bacteria. At the start, there are $u_0 = 5$ bacteria in a petri dish. Each day, the number of bacteria doubles.
Let u_n be the number of bacteria at the day n. What are the first five terms of the sequence (u_n)?

- $u_1 =$ ☐ bacteria
- $u_2 =$ ☐ bacteria
- $u_3 =$ ☐ bacteria
- $u_4 =$ ☐ bacteria
- $u_5 =$ ☐ bacteria

Ex 22: Let u_n be the number of steps I have walked at the end of day n.On day 0, I walk $u_0 = 1000$ steps. Each day, I walk 500 more steps than the previous day.
What are the first terms of the sequence (u_n)?

- $u_1 =$ ☐ steps
- $u_2 =$ ☐ steps
- $u_3 =$ ☐ steps
- $u_4 =$ ☐ steps
- $u_5 =$ ☐ steps

Ex 23: Suppose I deposit \$100 in a savings account. Each year, my amount is multiplied by 1.1 (that is, it increases by 10% every year).
Let u_n be the amount of money in the account after n years. What are the first five terms of the sequence (u_n)?

- $u_0 =$ ☐ dollars
- $u_1 =$ ☐ dollars
- $u_2 =$ ☐ dollars
- $u_3 =$ ☐ dollars
- $u_4 =$ ☐ dollars

Ex 24: Let u_n be the amount of money I have at the beginning of week n.At the start, I have $u_0 = 20$ dollars. At the end of each week, my parents give me \$ 10 more.
What are the first terms of the sequence (u_n)?

- $u_1 =$ ☐ dollars
- $u_2 =$ ☐ dollars
- $u_3 =$ ☐ dollars
- $u_4 =$ ☐ dollars
- $u_5 =$ ☐ dollars