Finding the Rule for Linear Patterns

Use the common difference and the starting value to find the rule for each pattern.

1a. Find the rule for the n-th term of the sequence: $7, 12, 17, 22, \ldots$

1b. Find the rule for the n-th term of the sequence: $18, 14, 10, 6, \ldots$

2a. Find the first 5 terms for the sequence whose rule is $2n + 3$

2b. Give the rule for the sequence of multiples of 5

3. Complete the table of values and find the linear rule connecting the term number (n) and the term value (T).

n	T
1	9
2	15
3	
4	27
5	

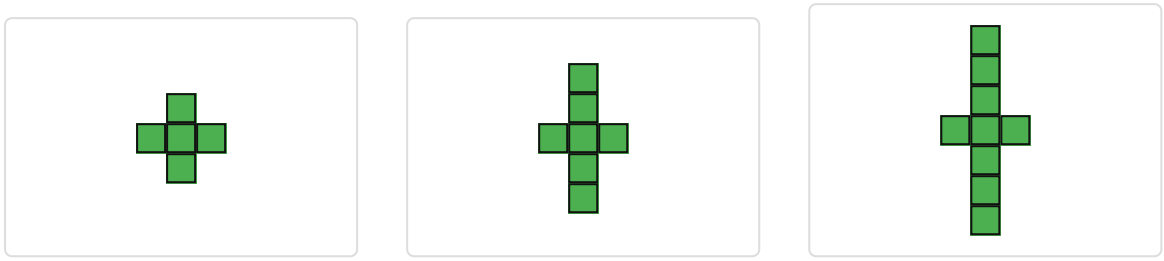
Rule: $T =$ _____

4. Complete the table of values and find the linear rule for the pattern.

Term Number (n)	**1**	**2**	**3**	**4**	**5**
Term Value	-2	1		7	

Rule: Term Value = _____

5. The visual pattern below is made from blocks. The first three terms are shown.



(a) Write down the sequence for the number of blocks in the pattern.

(b) Find the rule for the number of blocks in the n-th term.

(c) How many blocks would be needed for the 10th term?

6. The cost (C) of renting a kayak is a \$20 base fee plus \$5 per hour (h).

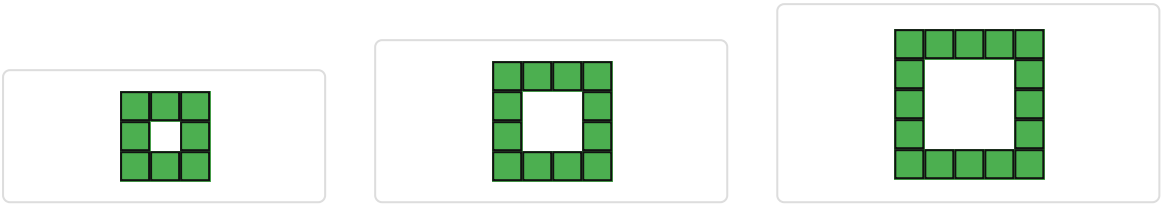
(a) Write a formula that connects the total cost (C) and the number of hours (h).

(b) Use your formula to find the cost of renting the kayak for 7 hours.

---

7. The rule for a linear pattern is $T = 6n - 5$. Which term number (n) in the pattern has a term value of 109?

8. A framer is creating square picture frames from small wooden blocks. The first three frame sizes are shown below:



(a) Write down the sequence for the number of blocks used in the first three frames.

Sequence:

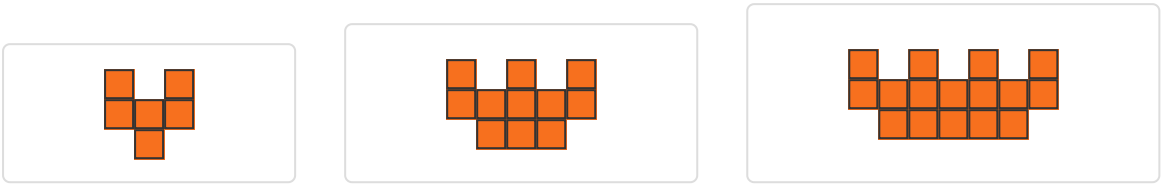
(b) Find the rule for the number of blocks needed for the n-th frame.

Rule:

(c) How many blocks would be needed to make the 15th frame?

15th Frame:

9. The following pattern of castle battlements is made from blocks. The number of blocks (B) for each term number (n) follows a linear rule.



Complete the table of values below:

Term Number (n)	**1**	**2**	**3**	**4**		n	
Number of Blocks (B)	6	11			106		m

10. Find the first three common terms of the sequences with rules $2n + 1$ and $3n + 2$

11. Find a rule for the sequence of common terms of $5n$ and $3n$.

12. Find a rule for the sequence of common terms of $2n - 1$ and $3n + 4$.

13. Explain why the square of a term in the sequence given by $2n + 1$ is also another term in the sequence.