

Using Variables to Describe Patterns



Quick Review

The pattern rule for the output is:

Start at 5. Add 2 each time.

This suggests the input numbers are multiplied by 2.

Multiply input 3 by 2: $3 \times 2 = 6$

To get output 9, add 3.

The pattern rule that relates the input to the output is: Multiply by 2. Then add 3.

We can use a variable in an expression to represent this rule.

Let the letter n represent any input number.

Then, the expression $2n + 3$ relates the input to the output.

Input	Output
1	5
2	7
3	9
4	11
5	13

Input	Output
1	$2 \times 1 + 3 = 5$
2	$2 \times 2 + 3 = 7$
3	$2 \times 3 + 3 = 9$
4	$2 \times 4 + 3 = 11$
5	$2 \times 5 + 3 = 13$
⋮	⋮
n	$2 \times n + 3$

Try These

- Complete each table of values, then write an expression that relates the input to the output.

a)

Input	Output
1	3
2	8
3	13
4	18
5	23
6	
7	
8	
9	

b)

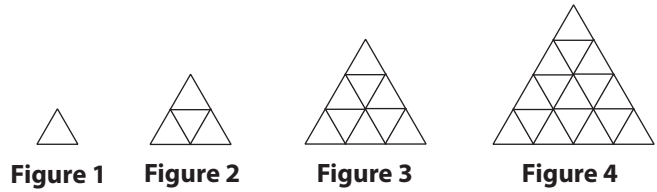
Input	Output
1	9
2	14
3	19
4	24
5	29
6	
7	

c)

Input	Output
0	4
1	10
2	16
3	22
4	28
5	

Practice

1. Here is a pattern of triangles.



- a) Complete the table.
 b) Write the pattern rule.

 c) Write an expression for the pattern.

 d) Find the number of triangles in the 8th figure.

Figure	Number of Triangles
1	
2	
3	
4	

2. For each table of values, write an expression to represent the pattern.

a)

Input	Output
1	1
2	5
3	9
4	13

b)

Input	Output
2	4
3	9
4	14
5	19

Stretch Your Thinking

- a) Use the expression $7n + 10$ to complete the table.
 b) Write and solve a story problem that matches the pattern.

Number	Amount (\$)
0	
1	
2	
3	
4	
