5.1 Representing Patterns – part 1

(pp. 158-162)

Name: _____

Date: May 1

Explore and Analyze

1. **Highlight** the left-hand leg of the equilateral triangle drawn below. Add legs to form a second and then a third equilateral triangle. How many legs did you add to make each new triangle?

add 2 legs to make each new triangle

2. Complete the table for up to 5 triangles

Number of Triangles (n)	Number of Highlighted Legs	Number of Unhighlighted Legs	Total Number of Legs (L)
1	1	2	3
2	1	4	5
3	1	6	7
4	1	8	9
5	1	10	11

(+2 between each row)

3. Write a formula that defines the total number of legs, L, need to form a given number of equilateral triangles, n.

$L = 1 + 2n$

number of legs added for each new △

number of highlighted legs (what we started with)

4. How many legs are needed to form 20 equilateral triangles?

what is L when n = 20?

$L = 1 + 2(20)$
$= 1 + 40$
$= 41$

need 41 legs to make 20 triangles.

5. How would the formula change if you used squares instead of triangles? Pentagons? Explain.

5 sides

4 sides

$L = 1 + 3n$

add 3 legs each time

$L = 1 + 4n$

add 4 legs each time

Summary

The equation we created is one way to represent the relationship between the number of triangles created and the total number of legs.

In our equation:

$L = 1 + 2n$

(equation for Δs)

number of legs (L) depends on the number of Δs (n)

the coefficient is 2

the constant is 1

the dependent variable is L

the independent variable is n

The relationship between the number of triangles created and the total number of legs can also be represented by a table of values.

A table of values can be arranged either horizontally or vertically.

independent variable (first row or first column)

Number of Triangles (n)	1	2	3	4	5
Total Number of Legs (L)	3	5	7	9	11

dependent variable (second row or second column)

Number of Triangles (n)	Total Number of Legs (L)
1	3
2	5
3	7
4	9
5	11

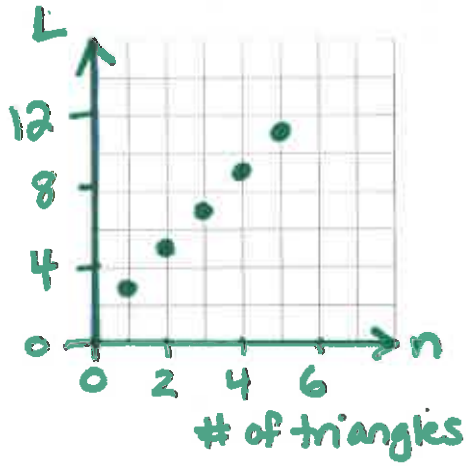
Another way we can represent the relationship between the number of triangles created and the total number of legs is with a graph.

dependent variable

y

x

independent variable



The relationship between the number of triangles created and the total number of legs is a **linear relation** (the points lie in a straight line).