6.1 Representing Patterns

If the following pattern of figures continues, draw the next two figures

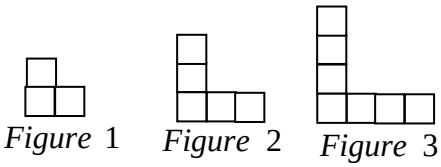


Figure 1 *Figure* 2 *Figure* 3

How many squares are in each figure?

How many squares do we add each time? _____

Terminology

Linear patterns: a sequence of numbers in which the pattern only involves addition or subtraction.

Common Difference d **:** is the difference between any two consecutive numbers in a linear pattern.

What is the common difference of the sequence above? _____

Example 1: Predict the next number in the pattern 1, 4, 7, 10, …? _____

Predict the 100^{th} number in the pattern? _____

Example 2: Determine the common difference of the following linear patterns and use it to find the next 3 numbers.

a) 5, 8, 11, 14, …. D = _____

_____, _____, _____

b) -5, 1, 7, 13, …. D = _____

_____, _____, _____

c) 10, 5, 0, -5, …. D= _____

_____, _____, _____

d) -5, -9, -13, -17,… D = _____

_____, _____, _____

What is a method for finding the common difference if you know two terms of a sequence?

Example 3: Find the common difference, then write an equation relating C to n. (Verify it works for every pair of values)

a)

n	1	2	3	4
C	5	8	11	14

d = _____ C = _____

c)

n	1	2	3	4
C	-5	-11	-17	-23

d = _____ C = _____

Example 4: Write an equation then use it to determine the 30^{th} number in the following linear pattern.

-8, -3, 2, 7…

Go back and verify your answer to **Example 1** using a formula.

Example 5: If the following pattern of figures continues, determine the number of squares in the 15^{th} figure?

a)

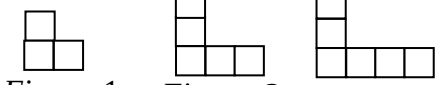


Figure 1 *Figure* 2 *Figure* 3

b)

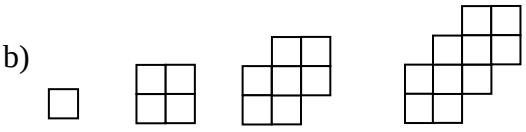
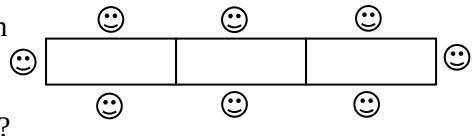


Fig 1 *Fig* 2 *Fig* 3 *Fig* 4

Example 6: A banquet table seats 8 people, three on each side and one on each end as shown in the diagram. Tables can be connected end to end.



a) How many additional people can be seated when a table is added?

b) Make a table to show how many people can sit at 1, 2, 3 & 4 tables.

c) Find a pattern and write an equation. Use *n* for the number of tables and *P* for the number of people.

d) Use your equation to determine how many people can be seated at 10 tables.

e) How many tables are needed to seat 344 people?

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