2.1 Use Inductive Reasoning

CC.9-12.G.CO.9 Prove theorems about lines and angles.

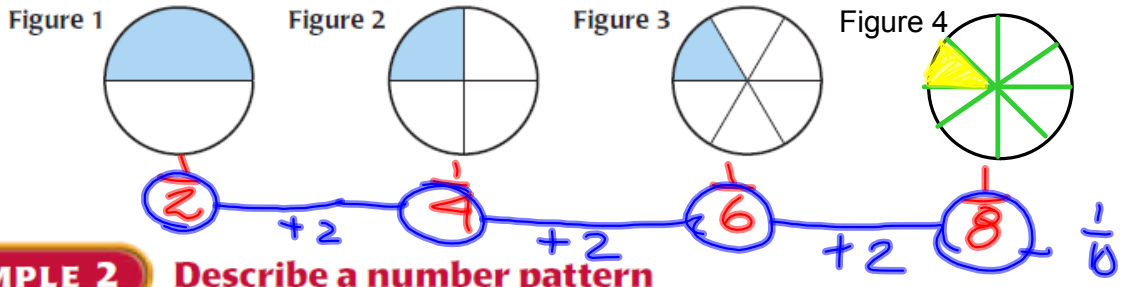
CC.9-12.G.CO.10 Prove theorems about triangles.

CC.9-12.G.CO.11 Prove theorems about parallelograms.

Big Idea: To use INDUCTIVE REASONING in mathematics.

EXAMPLE 1 **Describe a visual pattern**

Describe how to sketch the fourth figure in the pattern. Then sketch the fourth figure.



EXAMPLE 2 **Describe a number pattern**

Describe the pattern in the numbers −7, −21, −63, −189, . . . and write the next three numbers in the pattern.

−7, −21, −63, −189, . . . −567 −1701 −5103

×3 ×3 ×3 ×3 ×3 ×3

Sum of Integers (Z).

What is the sum of the first 20 Z?

even +

5 0 2 4 6 8 = 20 = 20

5 10 12 14 16 18 = 20+50 = 70

5 20 22 24 26 28 = 20+100 = 120

5 30 32 34 36 38 = 20+150 = 170

380

Sum of Integers (Z).

What is the sum of the first 20 Z?

odd +

1 3 5 7 9 = 25 = 25 100

11 13 15 17 19 = 25+50 = 75

21 23 25 27 29 = 25+100 = 125

31 33 35 37 39 = 25+150 = 175

400

CONJECTURE - An unproven statement that is based on AN OBSERVATION

INDUCTIVE REASONING - A process that includes looking for PATTERN and making CONJECTURE.

EXAMPLE 3 Make a conjecture

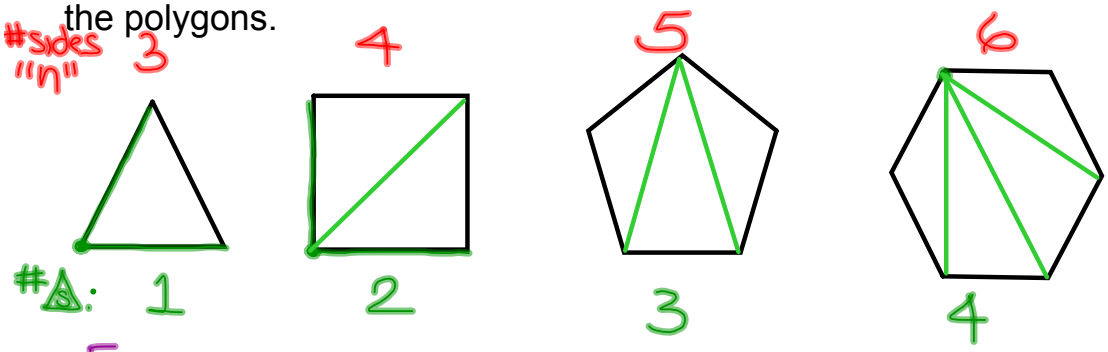
Given five points, make a conjecture about the number of ways to connect different pairs of the points.

Number of points	1	2	3	4	5
Picture					
Number of connections	0	1	3	6	10

+1 +2 +3 +4

PATTERNS:

How many TRIANGULAR REGIONS can you make from the polygons.



Formula: n-2

EXAMPLE 4 Make and test a conjecture

Numbers such as 1, 2 and 3 are called consecutive integers. Make and test a conjecture about the sum of any three consecutive integers.

0 + 1 + 2 = 3
1 + 2 + 3 = 6
2 + 3 + 4 = 9
3 + 4 + 5 = 12

Multiples of 3

20+21+22
63