

Warm Up

1. Find the length of a segment with endpoints $(1, -3)$ and $(-2, -7)$.
2. If $M(4, -3)$ is the midpoint of \overline{RS} and the coordinates of R are $(8, -2)$, find the coordinates of S .



3. Find the next three numbers in the following sequence:

0, 1, 3, 6, 10, ... 15 21 28

2-1 Inductive Reasoning

Conjecture - an unproven statement that we believe is true

Inductive Reasoning - using a pattern to make a conjecture

Ex 1 Describe the pattern in the numbers and write the next three numbers in the pattern.

1000, 500, 250, 125, ...

each # is $\frac{1}{2}$ previous #

62.5, 31.25, 15.625

Ex 2 Describe the pattern in the numbers and write the next three numbers in the pattern.

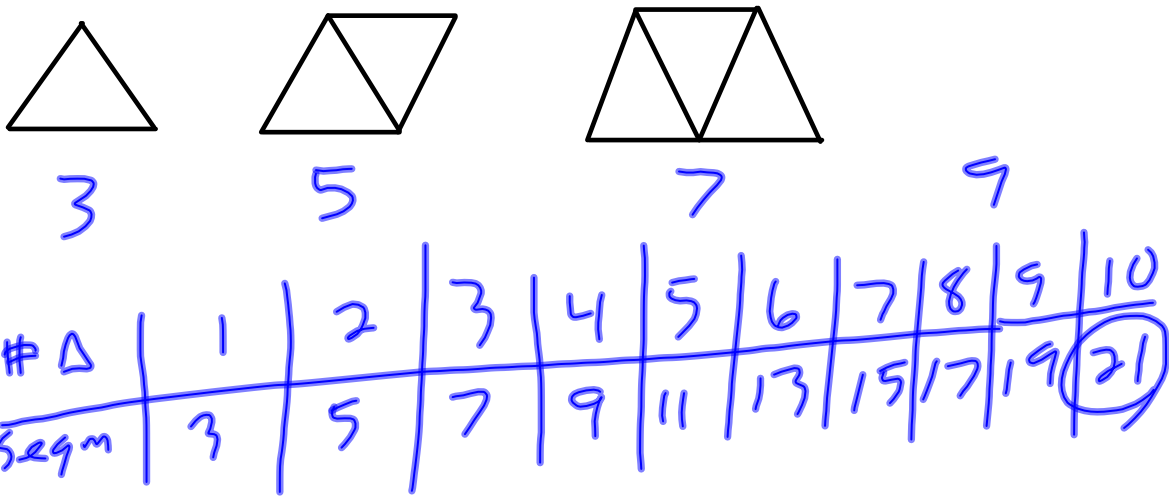
1, 5, 9, 13, ... 17, 21, 25
+4

3, 12, 48, 192, ... 768, 3072, 12,288
.4 .4 .4

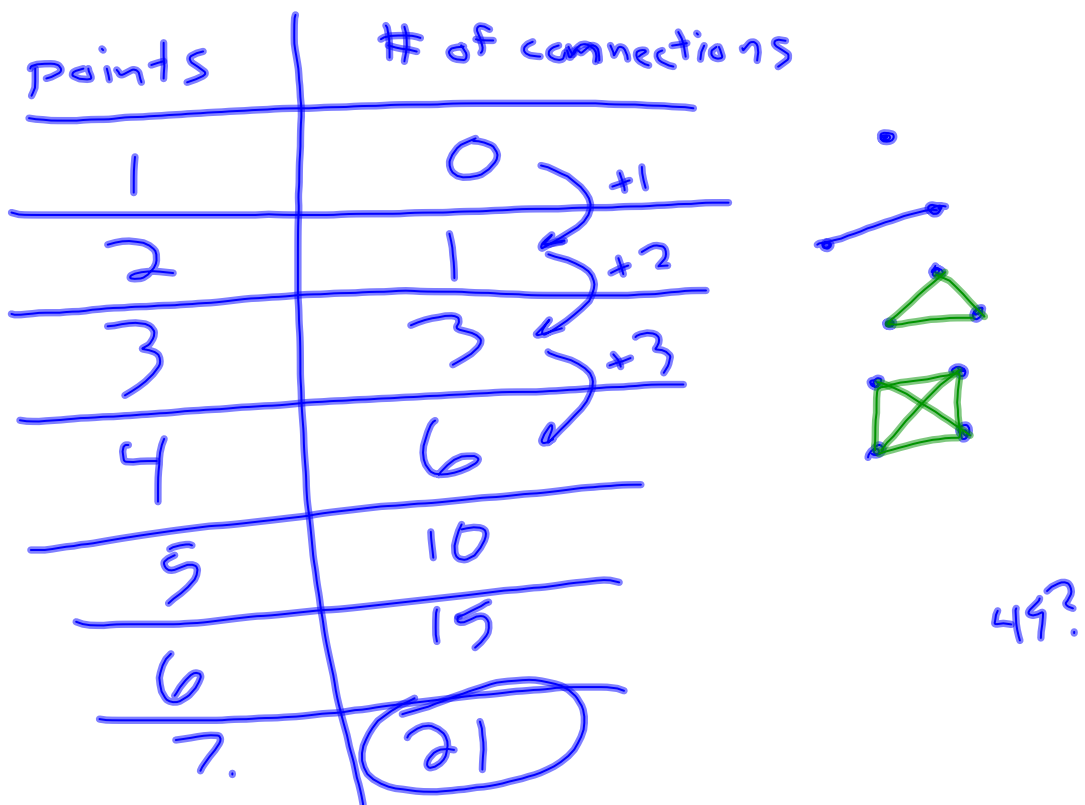
4, 3, 1, -2, ... -6, -11, -17
-1 -2 -3 -4 -5 -6

-5, -2, 4, 13, ... 25, 40, 58
+3 +6 +9 +12 +15 +18

Ex 3 Given the pattern of triangles, make a conjecture about the number of segments in a similar diagram with 10 triangles.



Ex. 4 Make a conjecture about the number of ways to connect seven noncollinear points.



Ex. 5 What conjecture can you make about the product of any two odd numbers?

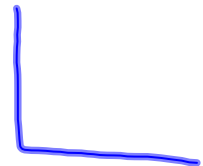
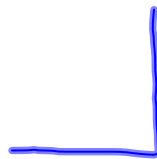
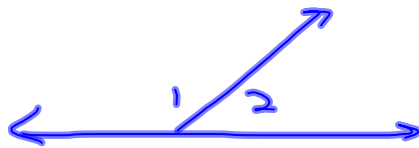
Answer will
be odd

$$5 \cdot 7 = 35$$

$$1 \cdot 19 = 19$$

Ex 6 Find a counterexample to disprove the conjecture:

Supplementary angles always form a linear pair.



Ex 7 Find a counterexample to disprove the conjecture:

If the product of two numbers is positive, then the two numbers must both be positive.

$$-3 \cdot -3 = 9$$

If the product of two numbers is even, then the two numbers must both be even.

$$7 \cdot 6 = 42$$