2.4 Mathematical Modeling

Objectives:

- **I CAN apply inductive reasoning to finding patterns.**
- **I CAN apply mathematical models to problem solving.**

Party Handshakes

Each of the 30 people at a party shook hands with everyone else. How many handshakes were there altogether?

Party Handshakes

Get into groups of four students.
Draw the table below in your Notes.

# of People	1	2	3	4	5
# of Handshakes		00:05			

Fill in the table. Under the table, briefly describe how your group figured out the answers.

Party Handshakes

# of People	1	2	3	4	5
# of Handshakes	0	1	3	6	10

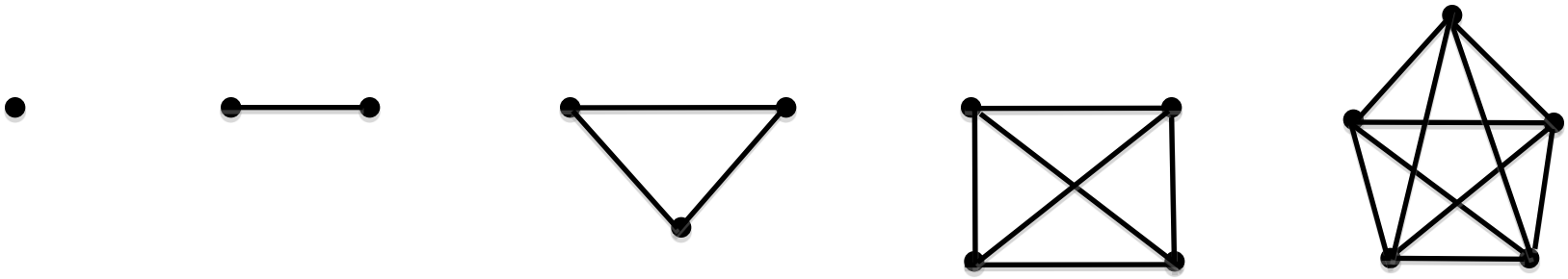
+1 +2 +3 +4

Answer the questions on your notes.

1. What happens to the number of handshakes as the number of people increase?
2. Is this a linear function? In other words, are the differences between the number of handshakes the same?

Party Handshakes

Points	1	2	3	4	5
Segments	0	1	3	6	10
Segments Per Vertex	0	1	2	3	4



How are these numbers related?

$$\text{Segments} = \frac{\text{Points}\left(\text{Segments Per Vertex}\right)}{2}$$

Party Handshakes

Points	1	2	3	4	5
Segments	0	1	3	6	10
Segments Per Vertex	0	1	2	3	4

$$\text{Segments} = \frac{\text{Points}\left(\text{Segments Per Vertex}\right)}{2}$$

$$\text{Handshakes} = \frac{\text{People}\left(\text{People} - 1\right)}{2}$$

$$\text{Handshakes} = \frac{p\left(p - 1\right)}{2}$$

Party Handshakes

Each of the 30 people at a party shook hands with everyone else. How many handshakes were there altogether?

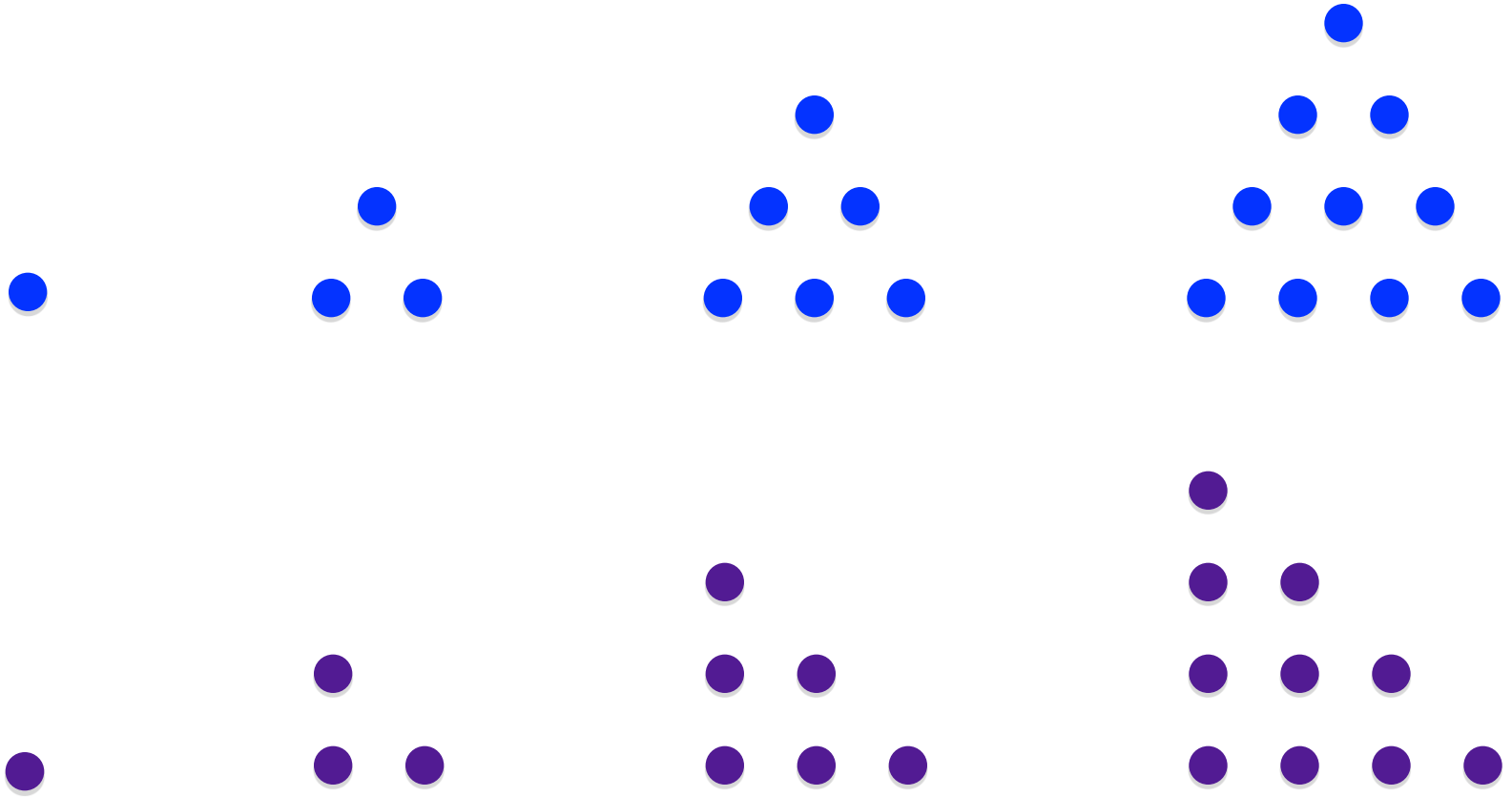
$$\text{Handshakes} = \frac{p(p-1)}{2}$$

$$\text{Handshakes} = \frac{30(30-1)}{2}$$

$$\text{Handshakes} = \frac{30(29)}{2} = 435$$

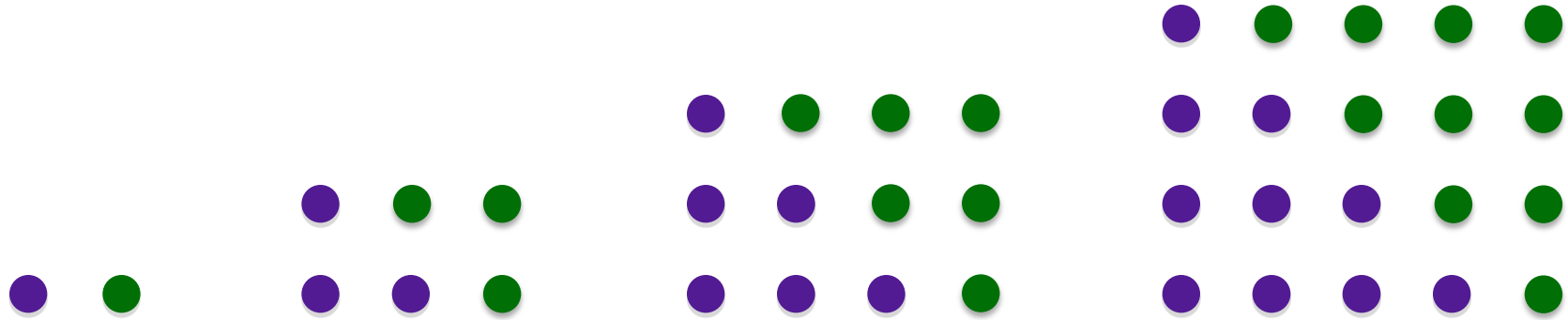
Triangular Numbers

Triangular Numbers: numbers that can be arranged into a triangular pattern of dots



Rectangular Numbers

Rectangular Numbers: numbers that can be arranged into a rectangular pattern of dots



$$\text{Rectangle} = lw = n(n+1)$$

$$\text{Triangle} = \frac{n(n+1)}{2}$$