College Mathematics
handshake problem

How many handshakes will take place if 5 people in a room each shakes hands with everyone else in the room?

Here are a few ways of representing the situation and solving the problem.

These ideas lead us to either a more step-by-step solution: \(4 + 3 + 2 + 1 = 10\), or a more all-at-once solution: \((5\text{ people})(4\text{ handshakes per person})/2 = 10\).
1. Draw a graph or picture illustrating all of the handshakes that would take place among 3 people if each person shakes hands with everyone else.

2. Draw a graph to show the handshakes that would take place among 4 people if each person shakes hands with everyone else.

3. Make a table showing all of the handshakes that would take place among 6 people if each one shakes hands with everyone else.

4. Calculate the number of handshakes that would take place among 10 people if each one shakes hands with everyone else.

5. How many handshakes would take place among 512 people if each one shakes hands with everyone else?