

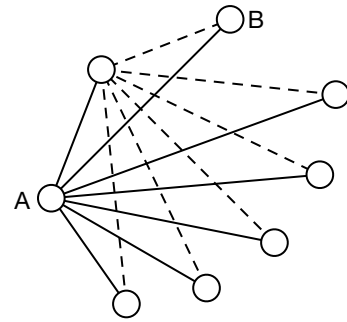
4-3 Draw a Diagram (Pages 181–183)

Drawing a diagram is a powerful problem-solving strategy.

EXAMPLE

Everyone in a group of 8 people shakes hands with each person in the group. How many handshakes occur?

Draw a diagram to represent each handshake with a line between the two people. Start with one person and draw lines to every other person (shown by the solid lines in the diagram). Notice that if A shakes hands with B, then B has shaken hands with A, and you only count that as one handshake. Then go to the next person and draw lines to the people that person has not already shaken hands with (shown by the dashed lines). At this point, you probably begin to see a pattern. The first person shakes 7 hands.

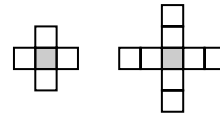


The second person shakes 6 more hands. The third person has already shaken hands with the first two, so there are 5 more. The fourth person has 4 more; the fifth person has 3 more; the sixth person has 2 more; the seventh person has 1 more. The eighth person has none left to shake. You might want to use colored pencils and a larger diagram to draw all the lines. To find the solution, add the handshakes: $7 + 6 + 5 + 4 + 3 + 2 + 1 = 28$.

PRACTICE

Solve. Use any strategy.

1. The diagram shows a plus sign made by starting with one gray block and adding one white block to each of its four sides, making a total of 5 blocks.



The next plus sign is made by adding two white blocks to each side of the gray block, making a total of 9 blocks. If the pattern continues, what will be the total number of blocks used when 8 white blocks are added to each side of the gray block?

2. **Coins** If 3 coins are tossed, how many possible outcomes are there? How many of these outcomes have exactly two heads?



3. **Standardized Test Practice** Sheryl is spending the afternoon at the mall. She first stops 20 minutes to play video games. Then she has a late lunch for 25 minutes. After this, she spends 45 minutes shopping. Lastly, she stops 5 minutes to get a cookie on her way out. If she finishes her trip at 3:10 P.M., what time did she start?

- A** 1:25 P.M. **B** 1:35 P.M. **C** 2:25 P.M. **D** 2:35 P.M.

Answers: 1. 33 blocks 2. 8; 3 3. B