

Chapter 1

Grade 6

Lesson 6

Solve a Simpler Problem

Answers

1. For example, Raven made the problem simpler by counting the number of handshakes for small groups rather than for 29 people, and then looking for a pattern that she could apply to a larger number of people.
2. For example, she checked it with 2, 3, 4, and 5 people. She saw that it worked for these numbers so she generalized for 29 people.
3. a) For example, I will count the number of yellow tiles for designs 1, 2, and 3 and look for a pattern I can use to find the number for design 7.
b) Design 1 has $1 \times 2 = 2$ yellow tiles.
Design 2 has $2 \times 3 = 6$ yellow tiles.
Design 3 has $3 \times 4 = 12$ yellow tiles.
The pattern is that the number of yellow tiles is equal to the design number multiplied by the design number plus one.
So design 7 will have $7 \times (7 + 1) = 7 \times 8$, which is 56 yellow tiles.
c) Following the pattern, design 15 will have $15 \times 16 = 240$ yellow tiles.

- 4. For example, design 1 has $4 + 4 + 1 + 1 = 10$ green tiles (top + bottom + side 1 + side 2).
Design 2 has $5 + 5 + 2 + 2 = 14$ green tiles.
Design 3 has $6 + 6 + 3 + 3 = 18$ green tiles.
The pattern is that the number of green tiles increases by 4 for each design. The first term is 10 and the common difference is 4. So the pattern rule is $10 + (\text{design number} - 1) \times (\text{common difference})$.
So design 7 will have $10 + 6 \times 4 = 10 + 24$ or 34 green tiles.
Design 15 will have $10 + 14 \times 4 = 10 + 56$ or 66 green tiles.

5. For example, count the number of tiles in the 1st, 2nd, and 3rd models and look for a pattern. Then apply a pattern rule to find the number of tiles in the 20th model.

The pattern 1, 3, 6, ... is the same as the one Raven had at the beginning of the lesson. The total number of tiles increases by the model number.

So the 20th model will have $20 + 19 + 18 + \dots + 3 + 2 + 1$. I can regroup to make the addition easier $(20 + 1) + (19 + 2) + \dots + (11 + 10) = 21 \times 10$, which is 210 tiles.

Model number	Number of tiles added	Total number of tiles
1	0	$1 + 0 = 1$
2	2	$1 + 2 = 3$
3	3	$3 + 3 = 6$