



Figure 1

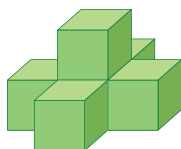


Figure 2

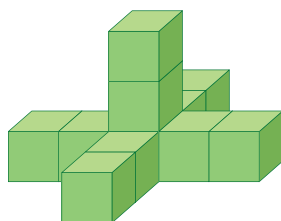


Figure 3

1. Danielle made the cube structures to the left.
 - a) What would the 4th and 5th structures look like? How many cubes would Danielle need to build each of these structures?
 - b) Make a conjecture about the relationship between the n th structure and the number of cubes needed to build it.
 - c) How many cubes would be needed to build the 25th structure? Explain how you know.
2. Frank tosses a coin five times, and each time it comes up tails. He makes the following conjecture: The coin will come up tails on every toss. Is his conjecture reasonable? Explain.
3. Koby claims that the perimeter of a pentagon with natural number dimensions will always be an odd number. Search for a counterexample to his claim.
4. Prove that the product of two consecutive odd integers is always odd.
5. Prove that the following number trick always results in 10: Choose a natural number. Double it. Add 20. Divide by 2. Subtract the original number.
6. Andy, Bonnie, Candice, and Darlene are standing in line to buy ice cream. Determine the order in which they are lined up, using these clues:
 - Candice is between Andy and Bonnie.
 - Darlene is next to Andy.
 - Bonnie is not first.
7. The following proof seems to show that $10 = 9.\overline{9}$. Is this proof valid? Explain.
Let $a = 9.\overline{9}$.

$$10a = 99.\overline{9} \quad \text{Multiply by 10.}$$

$$10a - a = 90 \quad \text{Subtract } a.$$

$$9a = 90 \quad \text{Simplify.}$$

$$a = 10 \quad \text{Divide by 9.}$$

WHAT DO You Think Now? Revisit **What Do You Think?** on page 5. How have your answers and explanations changed?