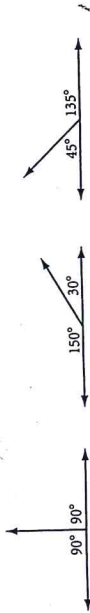


## 2.2 Exercises

- On his way to the local Hunting and Gathering Convention, caveperson Stony Grok picks up a rock, drops it into a lake, and notices that it sinks. He picks up a second rock, drops it into the lake, and notices that it also sinks. He does this five more times. Each time, the rock sinks straight to the bottom of the lake. Stony conjectures: "Ura nok seblu," which translates to 1. What counterexample would Stony Grok need to find to disprove, or at least to refine, his conjecture? **(H)**

- Sean draws these geometric figures on paper. His sister Courtney measures each angle with a protractor. They add the measures of each pair of angles to form a conjecture. Write their conjecture.



For Exercises 3–10, use inductive reasoning to find the next two terms in each sequence.

- 1, 10, 100, 1000, 1, 1
- $\frac{1}{6}, \frac{1}{3}, \frac{1}{2}, \frac{2}{3}, \frac{1}{2}, \frac{1}{6}$  **(H)**
- 1, 3, 6, 10, 15, 21, 1, 1
- 1, 4, 9, 16, 25, 36, 1, 1 **(H)**
- 1, 2, 3, 5, 8, 13, 1, 1 **(H)**
- 32, 30, 26, 20, 12, 2, 1, 1

For Exercises 11–16, use inductive reasoning to draw the next shape in each picture pattern.

- 
- 
- 
- 
- 
- 



- The sequence 2, 6, 12, 20, 30, 42, ... is called a rectangular number pattern because the terms can be visualized as rectangular arrangements of dots. What would be the 7th term in this sequence? What would be the 10th term? The 25th term? **(H)**



- Look at the pattern in these pairs of equations. Decide if the conjecture is true. If it is true, explain why. If it is not true, find a counterexample and explain why it is not true.

$$12^2 = 144 \quad \text{and} \quad 21^2 = 441$$

$$13^2 = 169 \quad \text{and} \quad 31^2 = 961$$

$$103^2 = 10609 \quad \text{and} \quad 301^2 = 90601$$

$$112^2 = 12544 \quad \text{and} \quad 211^2 = 44521$$

Conjecture: If two numbers have the same digits in reverse order, then the squares of those numbers will have identical digits, but in reverse order.

- Study the pattern and make a conjecture by completing the fifth line. What would be the conjecture for the sixth line? What about for the tenth line? **(H)**

$$1 \cdot 1 = 1$$

$$11 \cdot 11 = 121$$

$$111 \cdot 111 = 12,321$$

$$1,111 \cdot 1,111 = 1,234,321$$

$$11,111 \cdot 11,111 = \underline{\quad}$$

## 2.4 Exercises

- When you use 1 reasoning, you are generalizing (making a conjecture) from careful observation that something is probably true. When you use 2 reasoning, you are establishing that if a set of properties is accepted as true, something else must be true.
- $\angle A$  and  $\angle B$  are complementary.  $m\angle A = 25^\circ$ . What is  $m\angle B$ ? What type of reasoning do you use, inductive or deductive, when solving this problem?
- If the pattern continues, what are the next two terms? What type of reasoning do you use, inductive or deductive, when solving this problem?
- $\triangle DGT$  is isosceles with  $TD = DG$ . If the perimeter of  $\triangle DGT$  is 756 cm and  $GT = 240$  cm, then  $DG = \underline{\quad}$ . What type of reasoning do you use, inductive or deductive, when solving this problem?

