

Independent Practice

9.5

NAME _____

Module 9 Characteristics of Geometric Shapes
Lesson 5 Inductive and Deductive Reasoning

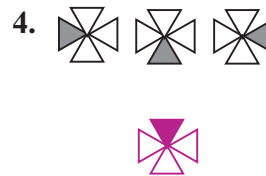
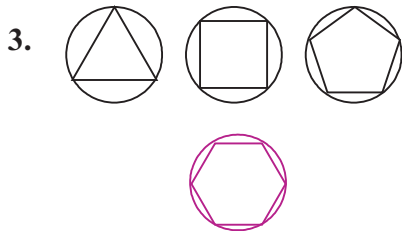
Give the next term in each sequence.

1. 1, 4, 9, 16, ...

25

2. 2, 3, 5, 8, 12, ...

17



5. Lynne knows that quadrilateral $ABCD$ has four congruent sides. She conjectured that the quadrilateral must be a square. Find a counterexample to prove her conjecture false.

A rhombus is a quadrilateral with four congruent sides.



6. Maggie noticed that $1^2 = 1$, $2^2 = 4$, and $3^2 = 9$. She conjectured that the square of any number is a positive number. Find a counterexample to prove her conjecture false.

$0^2 = 0$ and 0 is neither positive nor negative.

7. Determine if this argument is an example of inductive or deductive reasoning and determine its validity.

Every right triangle has two acute angles. In triangle ABC , $\angle A$ is a right angle. Therefore, $\angle B$ and $\angle C$ must be acute angles.

Deductive reasoning: Valid

8. Use deductive reasoning to prove that $\angle 1 \cong \angle 3$, given that $\angle 1$ and $\angle 2$ are supplementary and $\angle 3$ and $\angle 2$ are supplementary.



$$\begin{aligned}
 m\angle 1 + m\angle 2 &= 180^\circ \\
 m\angle 3 + m\angle 2 &= 180^\circ \\
 m\angle 1 + m\angle 2 &= m\angle 3 + m\angle 2 \\
 m\angle 1 &= m\angle 3 \\
 \text{Therefore, } \angle 1 &\cong \angle 3.
 \end{aligned}$$

Journal

1. Tell how inductive reasoning differs from deductive reasoning.
2. Explain the meaning of *conjecture*. Give two conjectures for the next term in the pattern 5, 25. How does the number of terms given in a pattern determine the likelihood of a conjecture being correct?
3. Explain the meaning of *counterexample*. Tell how $3 - (-5) = 8$ is a counterexample to the statement: "The difference of two numbers is always less than the minuend."

Cumulative Review

1. Draw a concave hexagon.

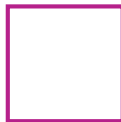
Possible Answer:



2. How many sides are in a decagon? **10**

3. Draw a regular quadrilateral.

Possible Answer:



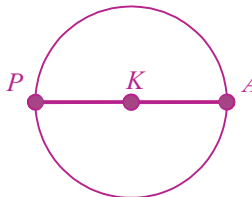
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Module 9 **Characteristics of Geometric Shapes**
Lesson 5 **Inductive and Deductive Reasoning**

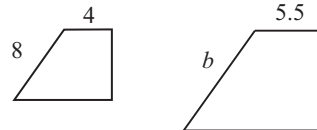
4. To the nearest inch, find the circumference of a circle with a diameter of 56 inches.

About 176 inches

5. Sketch a circle with radius \overline{KP} and diameter \overline{PA} .



6. The trapezoids are similar. Find the value of b .



$b = 11$

7. A 5 inch by 7 inch photo is enlarged to $6\frac{1}{4}$ inches by $8\frac{3}{4}$ inches. What is the scale factor, written as a percent?

The scale factor is 125%.

8. Bobby is making a scale drawing of a basketball court. His scale is $\frac{1}{4}$ in. = 1 ft.
What will be the dimensions of the court on the drawing if the actual dimensions are 50 feet by 84 feet?

The dimensions on the drawing will be $12\frac{1}{2}$ in. by 21 in.

Possible Journal Answers

1. Inductive reasoning draws conclusions from examples and patterns, while deductive reasoning draws conclusions from given facts through a logical process. Inductive reasoning goes from specific facts to a general conclusion, while deductive reasoning goes from general facts to a specific conclusion. In inductive reasoning, the conclusions are conjectures, which may be false. In deductive reasoning, the conclusions are always true. Deductive reasoning is proof.
2. A conjecture is a guess based on finding a pattern in given examples. If the pattern is to add 20, the next term is 45. If the pattern is to write increasing powers of five ($5^1, 5^2, 5^3, \dots$), the next term is 125. If more terms in the pattern were given, it would be more likely that a correct conjecture would be given.
3. A counterexample shows that a conjecture is not always true. That is, it shows that a statement is false. The equation $3 - (-5) = 8$ is a counterexample to the given statement because if it were true, then eight would be less than three, but eight is greater than three.