**Inductive reasoning** is a type of reasoning in which you look at a pattern and then make some type of prediction based on the pattern.

These predictions are also called **conjectures.**

**A conjecture** is a statement about what you think will happen based on the pattern you observed.

**Sample Problem 1**: **Make a conjecture about the next figure in the pattern. Then draw the figure.**

|  |  |
| --- | --- |
| **a.** |  **1 2 3 4** |
|  |  |
| **b.** |  **1 2 3 4** |
|  |  |
| **c.** |  **1 2 3 4** |
|  |  |

**Sample Problem 2**: **Write a rule for each number pattern, and find the next number.**

|  |  |
| --- | --- |
| **a.** | $$3, 7, 11, 15, 19…………….$$ |
|  |  |
| **b.** | $$1, 2, 4, 8, 16……………..$$ |
|  |  |
| **c.**  | $$10, 5, 2.5,.. 1.25$$ |
|  |   |

One way to show that a conjecture is not true is to find a counterexample.

**A counterexample** is an instance in which the conjectured pattern does not work.

Only one counterexample is needed to prove a conjecture false. A counterexample can be a drawing, a statement, or a number.

**Sample Problem 3**: **Find one counterexample to show that each conjecture is false.**

|  |  |  |
| --- | --- | --- |
| **a.** | The difference between two integers is always positive. |  |
| **b.** | All prime numbers are odd integers. |  |
| **c.** | If the product of two numbers is positive, then the two numbers must both be positive. |  |

***Finding the n term***

**Sample Problem 4**: **Find the n term.**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **a.** |

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| $$n$$ | $$1$$ | $$2$$ | $$3$$ | $$4$$ | $$5$$ | $$6$$ | $$7$$ |
| $$4n-2$$ |  |  |  |  |  |  |  |

 |
| **b.** |

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| $$n$$ | $$1$$ | $$2$$ | $$3$$ | $$4$$ | $$5$$ | $$6$$ | $$7$$ |
| $$5n+2$$ |  |  |  |  |  |  |  |

 |