

# Inductive and Deductive Reasoning

## UNIT 2 LESSON 1

# INDUCTIVE AND DEDUCTIVE REASONING

**Students will be able to:**

Analyze and identify statements using inductive and deductive reasoning.

## **Key Vocabulary**

- Inductive reasoning
- Deductive reasoning
- Conclusions

# INDUCTIVE AND DEDUCTIVE REASONING

## Inductive Reasoning

In inductive reasoning, a general conclusion is drawn from a set of examples.

{  
Example 1  
Example 2  
Example 3  
⋮  
Example N  
}



A general conclusion

## INDUCTIVE AND DEDUCTIVE REASONING

### Inductive Reasoning:

- Aims at probability, not certainty.
- Does not give a guarantee about the integrity of the conclusive statement.
- Can result to a false conclusion even if all the premises in a statement are true.
- Does not guarantee the conclusion to be logical scientifically or mathematically

## INDUCTIVE AND DEDUCTIVE REASONING

### Problem 1:

John visited two English Football clubs **Arsenal** and **Chelsea**, and came to know that the club players earn a lot of money. What conclusion he drew from this observation using inductive reasoning?

John made two observations:

1. The players of **Arsenal** football club earn a lot of money.
2. The players of **Chelsea** football club earn a lot of money.

These two observations are **particular to 2 football clubs**. He can generalize this observation to all English football clubs using inductive reasoning.

**Conclusion: All the players of English football Clubs earn a lot of money**

## INDUCTIVE AND DEDUCTIVE REASONING

The conclusion in the problem that **“All the players of English football clubs earn a lot of money”** seems logically possible but it is not statistically correct. There are a lot of English football clubs with low budgets and cannot afford expensive players. So the conclusion that All English players earn a lot of money is not entirely true yet the observation led to this belief.

### **Drawback with Inductive Reasoning:**

The major drawback of inductive reasoning is its failure in supporting the conclusion drawn with real life scenarios. However in some cases, the conclusion may get support from logic and thus become a theory (as in scientific reasoning).

# INDUCTIVE AND DEDUCTIVE REASONING

## Deductive Reasoning

In deductive reasoning, a statement is known to be true and other statement(s) are concluded from it.

A true statement

Deductive Reasoning

{  
Statement 1  
Statement 2  
Statement 3  
⋮  
Statement N  
}

## INDUCTIVE AND DEDUCTIVE REASONING

### Deductive Reasoning:

- Is a since-therefore scenario.
- Has a true statement to start with (generally), so all the deducted statements are also true (generally).
- Is not based on the observations in real life, since the given statement is already known to be true in most cases.
- If the given statement is not true worldwide or is not a known fact, then the deducted statements can also be false.



## INDUCTIVE AND DEDUCTIVE REASONING

### Problem 2:

All quadrilaterals have four sides. What statements can be deduced from this about a:

- a) Square
- b) Rectangle
- c) Parallelogram

Here we have been given a true statement that “**All quadrilaterals have four sides**”. So:

a) Since a square is also a quadrilateral, so it also has four sides. Our deduction is:

**All squares have four sides**

b) Since a rectangle is also a quadrilateral, so it also has four sides. Our deduction is:

**All rectangles have four sides**

c) Since a parallelogram is also a quadrilateral, so it also has four sides. Our deduction is:

**All parallelograms have four sides.**

## INDUCTIVE AND DEDUCTIVE REASONING

In problem 2, we started from a well-known true statement, so our deductions were also destined to be true. However in the context of **Problem 1**, if we were being told that:

**“All the players of English football clubs earn a lot of money”**

This statement is not statistically true, but we could deduce that:

Any non-divisional English football club (not naming any club) with low budgets has players earning a lot of money.

Here the deduction was possible, but was not as logical as it was with the a true well known statement to start with. This is a minor drawback with deductive reasoning.