

Section 1.4

Proving Conjectures: Deductive Reasoning

Deductive Reasoning

- drawing a specific conclusion through logical reasoning by starting with general assumptions that are known to be valid.

In other words: Start with something that has already been proven to be true to draw specific conclusions and to help prove something else.

There are different strategies to prove conjectures:

- Use a visual representation such as a Venn Diagram to help understand information in the example.
- Express conjectures as general statements. This involves choosing a variable to algebraically represent the situation. For example, two consecutive integers can be represented as x and $x+1$, or even using the transitive property.
- Use a 2-Column proof. This contains statements and reasons. It's a step by step approach to proving a conjecture. A statement is made in one column and its justification is made in the other column.

NOTE:

Deductive reasoning is different than inductive reasoning because:

Deductive starts with something that is already true, where as inductive starts with an assumption that may or may not be true.

Example 1:

All dogs are mammals. All mammals are vertebrates. Shaggy is a dog. What can be deduced about Shaggy?

This solution can also be shown in a Venn Diagram:

*This example can also be answered using the **Transitive Property**.*

Transitive Property

→ if two quantities are equal to the same quantity, then they are equal to each other.

→ if $a = b$ and $b = c$ then $a = c$.

Example 2

Jim is a barber. Everyone whose hair is cut by Jim gets a good haircut. Austin's hair was cut by Jim. What can you deduce about Austin?

Example 4:

Show using inductive reasoning and deductive reasoning that
*“the sum of four consecutive integers is equal to the sum of the
irst and last integers multiplied by two.”*

Inductive

Deductive



Differences Between Inductive and Deductive Reasoning

Inductive Reasoning

Deductive Reasoning

Even though inductive and deductive reasoning have differences, they are not separate entities. They can work together. Inductive reasoning can be used to show a pattern exists and then deductive reasoning can be used to prove it.

p.32 #7a, b (use x as the # it should be true for all), #8, #9

Attachments

PM11-1s4.gsp

1s4e2 finalt.mp4

1s4e3 finalt.mp4

1s4e4 finalt.mp4

1s4e5 finalt.mp4