

# Inductive and Deductive Reasoning

Jonathan R. Bacolod

Sauyo High School

# What is a Conjecture?

The conclusion drawn from observations, examples and pattern is called conjecture.

# What is an Argument?

An argument is a series of statements intended to determine the truth of another statement.

# What is Inductive Reasoning?

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- ▶ uses specific examples to arrive at a general rule, generalizations or conclusions
- ▶ a process of observing data, recognizing patterns, and making generalizations from observations



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- ▶ uses specific examples to arrive at a general rule, generalizations or conclusions
- ▶ a process of observing data, recognizing patterns, and making generalizations from observations
- ▶ is judging by experience
- ▶ involves uncertainty in making conclusions

# Example 1

Draw a conclusion from each given situation.

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1. 3, 10, 17, 24, 31. The next number is

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2. S, M, T, W, T, \_\_\_\_\_, S. The letter in the blank should be F.

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1. 3, 10, 17, 24, 31. The next number is 38.
2. S, M, T, W, T, \_\_\_\_\_, S. The letter in the blank should be F.
3. My Math teacher is strict. My previous Math teachers were strict. Therefore,



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3. My Math teacher is strict. My previous Math teachers were strict. Therefore, all math teachers are strict.
4.  $1 \times 10 = 10$ ,  $2 \times 10 = 20$ ,  $3 \times 10 = 30$ ,  $24 \times 10 = 240$ ,  $2345 \times 10 =$

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5. It has rained every day for the past six days, and it is raining today as well. Therefore,

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5. It has rained every day for the past six days, and it is raining today as well. Therefore, it will rain tomorrow.

## Example 2

Determine whether the conjecture is *True* or *False* based on the given information.

1. *Given*

The ages of the students in a Grade 8 class are 12, 13, 12, 12, 14, 13, 13, 13, 12, and 13.

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Determine whether the conjecture is *True* or *False* based on the given information.

1. *Given*

The ages of the students in a Grade 8 class are 12, 13, 12, 12, 14, 13, 13, 13, 12, and 13.

*Conjecture*

All the students in the class are at least 12 years old.

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$D$ ,  $E$ , and  $F$  are distinct points.



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All the students in the class are at least 12 years old.

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*Conjecture*

$D$ ,  $E$ , and  $F$  are collinear.

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4. *Given*  $\angle P$  and  $\angle R$  are right angles.

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- ▶ a type of reasoning which makes use of accepted rules of logic

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2. Conclusion: the statement drawn from the hypothesis

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Major Premise: If  $p$  is true, then  $q$  is true.

Minor Premise:  $p$  is true.

Conclusion: Therefore,  $q$  is true.



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Draw a conclusion from each given situation using deductive reasoning.

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Major Premise: If you are an 18-year old Filipino citizen, then you can vote.

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Minor Premise: Pete is an 18-year old Filipino.

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Conclusion: Therefore,

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Major Premise: If you are an 18-year old Filipino citizen, then you can vote.

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Conclusion: Therefore, Pete can vote.

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Major Premise: If a person has a driver's license, then he is allowed to drive.

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Conclusion: Therefore,

# Example 4

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Major Premise: If a person has a driver's license, then he is allowed to drive.

Minor Premise: Arturo has a driver's license.

Conclusion: Therefore, Arturo is allowed to drive.

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Minor Premise: If  $q$  is true, then  $r$  is true.

Conclusion: If  $p$ , then  $r$ .

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Major Premise: If it is May, then there are many flowers.



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Minor Premise: If you use less gasoline, then you save money.

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Conclusion: Therefore,

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Major Premise: If you drive a smaller car, then you will use less gasoline.

Minor Premise: If you use less gasoline, then you save money.

Conclusion: Therefore, If you drive a smaller car, then you save money.



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2. Coplanar points are points on the same plane.  $X$ ,  $Y$ ,  $Z$  are coplanar.

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3. A regular polygon is equilateral.  $ABCD$  is a regular quadrilateral.

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  - ▶ Therefore, Eloisa is a peace-loving person.

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Draw a conclusion from each given situation and identify the kind of reasoning used.

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  - ▶ Therefore, Eloisa is a peace-loving person.
  - ▶ Deductive reasoning

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Draw a conclusion from each given situation and identify the kind of reasoning used.

4. Filipinos are peace-loving people. Eloisa is a Filipino.
  - ▶ Therefore, Eloisa is a peace-loving person.
  - ▶ Deductive reasoning
5. J, F, M, A, M, \_\_\_\_\_, J.

# Example 7

Draw a conclusion from each given situation and identify the kind of reasoning used.

4. Filipinos are peace-loving people. Eloisa is a Filipino.

- ▶ Therefore, Eloisa is a peace-loving person.
- ▶ Deductive reasoning

5. J, F, M, A, M, \_\_\_\_\_, J.

- ▶ The letter in the blank should be

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Draw a conclusion from each given situation and identify the kind of reasoning used.

4. Filipinos are peace-loving people. Eloisa is a Filipino.

- ▶ Therefore, Eloisa is a peace-loving person.
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5. J, F, M, A, M, \_\_\_\_\_, J.

- ▶ The letter in the blank should be J.

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4. Filipinos are peace-loving people. Eloisa is a Filipino.
  - ▶ Therefore, Eloisa is a peace-loving person.
  - ▶ Deductive reasoning
5. J, F, M, A, M, \_\_\_\_\_, J.
  - ▶ The letter in the blank should be J.
  - ▶ Inductive reasoning
6. Niku is Danica's cousin. Donna is Danica's twin sister.

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5. J, F, M, A, M, \_\_\_\_\_, J.
  - ▶ The letter in the blank should be J.
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6. Niku is Danica's cousin. Donna is Danica's twin sister.
  - ▶ Therefore, Niku is also Donna's cousin.

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# Example 7

7. If a person does not get enough sleep, that person will be tired. Marcos does not get enough sleep.

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8. 4, 8, 16, 32, \_\_\_\_\_, \_\_\_\_\_

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8. 4, 8, 16, 32, \_\_\_\_\_, \_\_\_\_\_
- ▶ The next two numbers are



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8. 4, 8, 16, 32, \_\_\_\_\_, \_\_\_\_\_
- ▶ The next two numbers are 64 and 128.

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  - ▶ Inductive reasoning
9. All piano players are musicians. Fred is a piano player.

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10. 1, 2, 4, 7, 11, \_\_\_\_\_

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  - ▶ The next number should be



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  - ▶ The next number should be 16.

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10. 1, 2, 4, 7, 11, \_\_\_\_\_
  - ▶ The next number should be 16.
  - ▶ Inductive reasoning

**Thank you for watching.**