

Name \_\_\_\_\_ Date \_\_\_\_\_

Key

## A Little Dash of Logic

### Foundations for Proof

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1. Joseph reads a journal article that states that yogurt with live cultures greatly helps digestion and prevents problems associated with lactose intolerance. He notices that his mother has problems with digestion and is lactose intolerant. He suggests that she try eating yogurt because he thinks it may help her feel better.

a. What is the specific information in this situation?

Joseph's mother has problems with digestion and is lactose intolerant.

b. What is the general information in this situation?

Live yogurt cultures greatly help with digestion and prevent problems associated with lactose intolerance.

c. What is the conclusion in this situation?

Yogurt may help Joseph's mother feel better.

d. Did Joseph use inductive reasoning or deductive reasoning to make his conclusion?

Explain your reasoning.

Joseph used DEDUCTIVE reasoning, because he took general rules about yogurt cultures and applied them to his specific situation.

e. Is Joseph's conclusion correct? Explain your reasoning.

Probably. If the information in the article is true, then yogurt should help Joseph's mom feel better.

2. Chaun is looking through records at a record store with her friend Ronaldo. She comes across a record she has not heard by a band she enjoys. Ronaldo knows that Chaun has five records at home by this band and that she likes all of them. He concludes that she will probably like any record made by this band. He tells Chaun so. She buys the record, saying to herself, "I will probably like this record, because I like records made by this band."

a. What conclusion did Ronaldo make? Why?

Ronaldo concludes that Chaun will probably like any record by the band, since she already has five of their records and likes them all.

b. What type of reasoning did Ronaldo use? Explain your reasoning.

He used INDUCTIVE reasoning, because he used specific facts to make a general rule about Chaun's taste in music.

c. What conclusion did Chaun make? Why?

Chaun concluded that she will probably like the new record, so she buys it ... because Ronaldo said she'd like any record by that band.

d. What type of reasoning did Chaun use? Explain your reasoning.

Chaun used DEDUCTIVE reasoning by using Ronaldo's general rule and applying it to her specific case of the new record.

e. Is Ronaldo's conclusion definitely true? Is Chaun's conclusion definitely true? Explain your reasoning.

Neither conclusion is definitely true because the band may have changed in such a way that Chaun doesn't like the new record.

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3. Use the following statement to answer each question.

The sum of the measures of angle  $A$  and angle  $B$  is 90 degrees. Therefore, the angles are complementary.

- a. Write the conditional statement in propositional form.

If the sum of the measures of angle  $A$  and angle  $B$  is  $90^\circ$ , then the angles are complementary.

- b. Identify the hypothesis and the conclusion of the conditional statement.

hypothesis — the sum of the measures of  $\angle A$  and  $\angle B$  is  $90^\circ$

conclusion — the angles are complementary

- c. If the hypothesis and conclusion of the conditional statement are both false, what does this mean in terms of the conditional statement?

This means that the sum of the measures of  $\angle A$  and  $\angle B$  is NOT  $90^\circ$ , and the angles are NOT complementary.

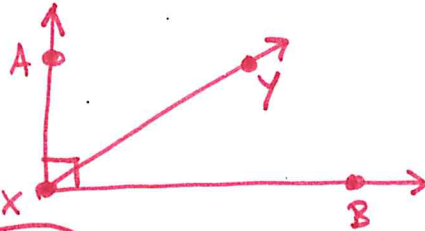
- d. What is the truth value of the conditional statement if the hypothesis and conclusion are both false?

Truth Value = TRUE

4. Sketch a figure to illustrate the given conditional statement. Then rewrite the conditional statement by separating the hypothesis and conclusion into "Given" information and "Prove" information.

If  $\angle AXB$  is a right angle and  $\overrightarrow{XY}$  bisects  $\angle AXB$ , then  $m\angle AXY = 45^\circ$  and  $m\angle BXY = 45^\circ$ .

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Given:

Prove:

$\angle AXB$  is a right  $\angle$   
 $\overrightarrow{XY}$  bisects  $\angle AXB$

$m\angle AXY = 45^\circ$  and  $m\angle BXY = 45^\circ$