

Warm Up

Write the converse, inverse, and contrapositive of the following statement. Is each statement true?

If the measure of an angle is less than 90° , then the angle is acute

1. converse: if an angle is acute then it measures less than 90° . True T
2. inverse: If the measure of an angle is not less than 90° , then the angle is not acute. T
3. contrapositive: If the angle is not acute then the measure of an angle is not less than 90° T

2-3 Deductive Reasoning

Inductive reasoning - using simpler examples or a pattern to come up with a conjecture

Deductive reasoning - use definitions and properties to come up with a conjecture

Law of Detachment - If $p \rightarrow q$ is true

If p is true, then q
is true

Law of Syllogism - If $p \rightarrow q$ and
if $q \rightarrow r$ then

$p \rightarrow r$

Ex 1 Use the Law of Detachment to make a valid conclusion in the true situation.

If two angles are right angles, then they are congruent.
 $\angle C$ and $\angle D$ are right angles.

$\angle C \cong \angle D$

If Nathan is enrolled at Oregon High School, then he has an ID#. Nathan is enrolled at OHS.

Nathan has an ID #

Ex 2 Use the Law of Detachment to make a valid conclusion in the true situation.

If two segments have the same length, they are congruent. $AB = CD$.

$$\overline{AB} \cong \overline{CD}$$

Tony goes to every OHS football game. There is a football game this Friday.

Tony will go to the game.

Ex 3 If possible, use the Law of Syllogism to write a new conditional statement that follows from the pair of true statements.

If Stan takes geometry this year, then he will take Algebra 2 next year. If Stan takes Algebra 2 next year, then he will graduate.

if he takes geometry
then he will graduate

If the radius of a circle is 4 ft, then the diameter is 8 ft. If the radius of a circle is 4 ft, then its area is 16π ft².

No conclusion

Ex 4 If possible, use the Law of Syllogism to write a new conditional statement that follows from the pair of true statements.

If Mary makes \$50, she will buy a new video game. If she buys a new video game, she will not do her geometry homework.

if Mary make \$50, then she won't do geom. h.w.

If $y^3 = 8$, then $y = 2$. If $y = 2$, then $3y + 4 = 10$.

if $y^3 = 8$ then $3y + 4 = 10$

Ex 5 What conclusion can be made about the product of two odd numbers?

$I +$ will be odd

$3 \cdot 5 = 15$
 $1 \cdot 13 = 13$
 $71 \cdot 11 = 781$

← inductive

$(2x+1)(2x+1) = \dots + 1$

← deductive

Ex 6 Use the statements below to determine whether each conclusion is true or false.

If Isaac becomes a math teacher, then he will be wealthy.

If Isaac graduates high school, then he will go to college.

If Isaac goes to college, then he will become a math teacher.

Isaac graduated high school.

- a. Isaac will be wealthy.
- b. Isaac will have fun in college.
- c. Isaac will be a math teacher.