

5.4 Homework

For each conditional statement below:

- Draw an Euler diagram that represents the statement,
- Write the inverse of the statement, and
- Write the contrapositive of the statement.

- If a figure is rectangle, then it has four sides.
- If the food is from Panda Express, then it is good.
- If today is Tuesday, then I'm eating tacos.

Using your answers from the previous problems, find the answer to this question.

- Does the inverse or the contrapositive have the truth value as the original conditional statement?

To prove a theorem indirectly, we begin by assuming the opposite of the conclusion. For each conclusion listed below, write the beginning assumption.

- Angle B is a right angle.
- Lines a and b are parallel.
- Katie Ledecky is the GOAT of swimmers.

Identify the two statements that contradict each other.

- Build a new jail.
 - Build the new jail out of the materials of the old jail.
 - Use the old jail until the new jail is finished.
- Triangle ABC is equilateral.
 - Triangle ABC is a right triangle.
 - Triangle ABC is isosceles.
- Lines c and d are skew.
 - Lines c and d do not intersect.
 - $c \parallel d$

A classroom has five rows of five desks per row. The teacher asks the pupils to change their seat by moving either one seat forward or back or one seat to the left or right. Complete the following proof.

- Theorem: The pupils can't obey their teacher.

(What's the starting assumption?) _____

If they can obey the teacher, the 13 pupils at the black desks will move to the brown desks.

(Look at the picture to tell what this contradicts.)

Therefore, our assumption is false and ...

(What conclusion follows?)

