Assignment 4 (10/6)

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Problem 1

Review of Comparisons:

Implication	$P \implies Q$	First statement implies the second
Inverse	$\neg P \implies \neg Q$	Negation of both Statements
Converse	$Q \implies P$	Reversal of both statements
Contrapositive	$\neg Q \implies \neg P$	Reversal and negation of both statements
Negation	$\neg(P \implies Q)$	Contradicts the implication

The "Negation" can also be written as "P is true but not Q". Note that it is **not** a "if-then" comparison.

Examples:

Take the statement "All red objects have color." This can be equivalently expressed as "If an object is red, then it has color."

The **contrapositive** is "If an object does not have color, then it is not red." This follows logically from our initial statement and, like it, it is evidently true.

In other words, the contrapositive is logically equivalent to a given conditional statement

The **inverse** is "If an object is not red, then it does not have color." An object which is blue is not red, and still has color. Therefore in this case the inverse is false.

The **converse** is "If an object has color, then it is red." Objects can have other colors, of course, so, the converse of our statement is false.

The **negation** is "There exists a red object that does not have color." This statement is false because the initial statement which it negates is true.

[Source: Wikipedia!]

Assignment:

Write the converse, inverse, negation and contrapositive of the following statement:

If n is divisible by 4, then n is divisible by 2.

Problem 2

Problems 1.6.$(33, 36, 53, 58, 63, 67)$.

Problem 3

Prove that $\sin(\frac{3\pi}{2} - \theta) = -\cos\theta$. What is $\cos(\frac{3\pi}{2} - \theta)$?

Problem 4

Problems $7, 22, 58$ from the review exercises of chapter 1. You can find these at the end of the chapter.

Problem 5

This will not be graded. Solving this will earn you a candy!

Solve for θ in the interval $[0, 2\pi]$.

$$\sin\theta + \cos\theta = \sqrt{2}.$$

There will be a problem session Monday 5-6PM in Eckhart 308. Please attend the problem sessions and office hours if you have any questions and need clarification.

In today's problem session, we are going to discuss some of the homework problems (old and new) and discuss how to 'write' a proof.