MATH 102: IDEAS OF MATH

WORKSHEET 2

1. Logical connectives

There are four logical connectives (some call them logical operators)

$$\neg, \wedge, \vee, \implies$$

Definition 1.1. A **propositional variable** is a symbol that represents a proposition.

Definition 1.2. A **propositional formula** is an expression that is either a propositional variable, or is built up from simpler propositional formulae using logical connectives.

Problem 1.1. Analyze the form of the following statements.

(1) Either John went to the store, or we're out of eggs.
(2) Joe is going to leave home and not come back.
(3) Either Bill is at work and Jane isn't, or Jane is at work and Bill isn't.
(4) If today is Sunday, then I don't have to go to work today.

Problem 1.2. (1) Write a propositional formula that is built from at least two propositional formulae that are not propositional variables.
(2) Cook up an English sentence that has the structure made by the above propositional formula.

Problem 1.3. True or false? $(P \wedge \neg P) \implies Q$. Here P and Q stand for any sentence/statement.

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