

Bridge - MGF 3301 - Section 001

Homework 2

Instructions: Solve the following exercises in a **separate sheet of paper**. Be tidy and organized! You can work on the exercises with your friends (or enemies!) but the final editing has to be yours. This homework has to be returned **by Wednesday January 29 at 9:30 am**. The total number for this homework is 110 (there are 10 extra points). The grade you will receive for this homework will count as a part of *Homework* component of the total grade (15%).

Note: Answers that are not fully and properly justified will not receive full credits.

Ex 1. (20+30 points)

(1.1) For an integer n , consider the following proposition:

" n is even and $n > 10$."

What is a **denial** of it?

- n is not even and $n \leq 10$;
- n is even or $n > 10$;
- n is odd or $n \leq 10$.

Justify your answer.

(1.2) Write a non-trivial denial (i.e. not of the form *It is not the case that...*) for each one of the following propositions. (No need of justifying your answers here.)

- I read the book and I do not listen to music;
- $1 < x < 2$ or $x = 0$;
- The pawn is black or white.

Ex 2. (20+20 points)

(2.1) The propositional form

$$P \Rightarrow Q$$

is **equivalent** to one of the following forms:

- $P \vee (\sim Q)$;
- $(\sim P) \wedge Q$;
- $(\sim P) \vee Q$.

Which one? Justify your answer.

(2.2) Consider now the following proposition:

"If I study bridge, then I pass the class."

Given what you have proven in (2.1), what is a **denial** of the above proposition?

- I study bridge or I do not pass the class;
- I study bridge and I do not pass the class.
- I do not study bridge and I pass the class;

Justify your answer.

Ex 3. (20 points) For x a real number, consider the following statement:

$$x^2 > 0 \Rightarrow x > 0.$$

Is it true for every number x ? If yes prove it, otherwise find a number x that makes the statement false.