1. [5pts] Which of the following are statements? Comment on the truth values of all the statements. If a sentence fails to be a statement, explain why.

(a) All swans are white.
(b) There may or may not be largest number
(c) There is no largest number.
(d) He, she or it is lying.
(e) This sentence no verb.

2. [5pts] Translate the following English sentence into a logical expression. (Make sure you define your notation). Give conditions when this compound statement is not true.

"You cannot ride the roller coaster if you are less than 4 feet tall unless you are older than 16 years old."

3. [6pts] Let p: "Polly sings well", q: "Quentin writes well" and r: "Rita is good at math".

(I) write the following sentences in symbolic form.

(II) Assume that it is true that "Polly sings well", it is false that "Quentin writes well" and it is true that "Rita is good at math". Determine the truth value of these sentences. (Note that here you do NOT have to work on an entire truth table, only one line of it corresponding to the given truth values)

(a) Polly sings poorly and Quentin writes well.
(b) Either Polly sings well and Quentin writes poorly, or Rita is not good at math.
(c) Polly sings well, and either Quentin writes well or Rita is good at math.

4. [7pts] Using the following symbolic representations of statements:

p: you don’t have to do homework
q: you understand everything
r: you pay attention

Express the following syllogism symbolically and use a truth table to determine if it is logically valid:

1. You don’t have to do homework only if you understand everything.
2. You understand everything if you pay attention.
3. You pay attention.

Therefore, you don’t have to do homework.