[1] Consider we have the following hypotheses by Shokria
1. If it does not rain or it is not foggy then I go to my grandmother and a party will be held.
2. If the party will be held, then there is a cake.
3. There is not a cake.

Prove that "it rained".

To unify answers, you must :
1. Use prepositional logic derivations on symbols {p, q, r, s, t}
2. Use or-introduction, and-elimination, modus tollens, modus ponens in your proof.

Suppose :

$$P \dots \text{it rains.}$$
$$Q \dots \text{it foggy.}$$
$$R \dots \text{I go to my grandmother.}$$
$$S \dots \text{party will be held.}$$
$$T \dots \text{there is a cake.}$$

Proof :

$(\neg P \vee \neg Q) \Rightarrow (R \wedge S)$	(1) ASSUMPTION
$S \Rightarrow T$	(2) ASSUMPTION
$\neg T$	(3) ASSUMPTION
$\neg S$	(4) MT on (2), (3)
$\neg S \vee \neg R$	(5) or-introduction on (4)
$(\neg R \vee \neg S) \Rightarrow (P \wedge Q)$	(6) contraposition on (1)
$(P \wedge Q)$	(7) MP on (4), (6)
P	(8) and-elimination on (7)