Stanford University
Introduction to Logic

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Feedback — 6.2 Properties of Sentences

You achieved a score of 3.00 out of 3.00

Say whether each of the following sentences is valid, contingent, or unsatisfiable.

Question 1

$\forall x.\, p(x) \land \exists x.\, \neg p(x)$

Your Answer		Score	Explanation
Unsatisfiable	✔	1.00	
Total		1.00 / 1.00	

Question 2

$\forall x.\, p(x) \Rightarrow \exists x.\, \neg p(x)$

Your Answer		Score	Explanation
Contingent	✔	1.00	
Total		1.00 / 1.00	

$\exists x.\, \neg p(x)$ is equivalent to $\neg \forall x.\, p(x)$. Therefore, the sentence is of the form $\phi \Rightarrow \neg \phi$, which is equivalent to $\neg \phi$. Clearly, this sentence can be made either true or false.

Question 3

$\neg \forall x.\, p(x) \lor \neg \exists x.\, \neg p(x)$

Your Answer		Score	Explanation
Valid	✔	1.00	
Total		1.00 / 1.00	

$\neg \exists x.\, \neg p(x)$ is equivalent to $\forall x.\, p(x)$. The sentence is equivalent to $\neg \forall x.\, p(x) \lor \forall x.\, p(x)$, which is clearly true in all truth assignments.