

$$p \rightarrow q$$

$$q$$

$$\therefore p$$

Is this valid?

NO

Steps of Proof	Reason
1. $q$ is true	Given
2. $(p \rightarrow q)$ is true	Given
3. $(\text{false} \rightarrow \text{true})$ is true	#1 & #2 with possible fact
4. $p$ could be false	From #3
5. It is invalid for that $p$ must be true	From #4

$$p \vee q$$

$$\sim q$$

$$\therefore p$$

Is this valid?

Yes

Steps of Proof	Reason
1. $\sim q$ is true	Given
2. $q$ is false	Opposite of true is false
3. $(p \vee q)$ is true	Given
4. $(\text{false} \vee \text{false})$ is false	Fact
5. $p$ must be true	From #2 & #4

$$p \rightarrow (q \wedge r)$$

$$p$$

$$\therefore r$$

Is this valid?

Yes

Steps of Proof	Reason
1. $p$ is true	Given
2. $(p \rightarrow (q \wedge r))$ is true	Given
3. $(\text{true} \rightarrow (q \wedge r))$ is true	From #1 & #2
4. $(\text{true} \rightarrow \text{true})$ is true	Fact
5. $(\text{true} \rightarrow \text{false})$ is false	Fact
6. $(q \wedge r)$ must be true	From #3, #4 & #5
7. $r$ must be true	From #5 & connections with "and" must be all true