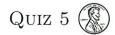
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Name:	Richard	



1. Without changing its meaning, write the following sentence in the form of "If P, then Q."

The quadratic equation has no real solutions provided that the discriminant is negative.

If the discriminant is negative, then the quadratic equation has no real solutions.

Use a truth table to decide if $\sim P \land (P \Rightarrow Q)$ and $\sim (Q \Rightarrow P)$ are logically equivalent. 2.

PQ	Q>P	$\sim (Q \Rightarrow P)$	~P	P>Q	$\sim P \wedge (P \Rightarrow Q)$
TT	T	F		T	(F)
FFF	F	TF	T	T	T

The columns don't guite agree, so the two expressions are not logically equivalent)

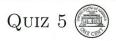
3. Suppose that $((P \land Q) \lor R) \Rightarrow (R \lor S)$ is false. Find the T/F values for P, Q, R and S. (This can be done without writing a truth table.)

This con only be false if (PAQ)VR = T and RVS = F.

For RVS to be false, both R and S are false.
But then in order that $(P \wedge Q) \vee R = T$, it must be that $P \wedge Q = T$, so both P and Q are true

Answer: SP=T Q=T R=F

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Name:	Richard	



1. Without changing its meaning, write the following sentence in the form of "If P, then Q."

A geometric series with ratio r converges whenever |r| < 1.

If IrI< I, then a geometric series with ratio r converges.

Use a truth table to decide if $P \Rightarrow \sim Q$ and $\sim P \lor \sim Q$ are logically equivalent. 2.

P. Q	~Q!	P>~Q	~P]	~PV~Q
T	F	(F)	F	Comment of the second control of the second
TF	T;	T	F?	
FT	F!	T	IT:	T
FF	1 7		IT,	

The columns agree, so P>NQ = ~PV~Q, i.e. They are logically equivalent

3. Suppose that $((\sim R \lor P) \Leftrightarrow Q) \land (\sim Q)$ is true. Find the T/F values for P, Q and R. (This can be done without writing a truth table.)

For this to be true, both (NRVP) (and and NQ must be true, Therefore Q is false But then for (NRVP) (Q to be true,

~RVP must be false. Hence both ~R and P are false, i.e. Ris true and Pisfalse.

Answer: P=FQ=FR=T/