Mathematics 300

Quiz 7 Name: Key

You must show your work to get full credit.

1. (a) Write the sentence "$x = 1$ whenever $x^2 = 1$" in the form "If P, then Q."

If $x^2 = 1$, then $x = 1$.

(b) Is the sentence of part (a) true? True or False? False.

As $x^2 = 1$ only implies $x = \pm 1$

2. Are $\sim(P \wedge \sim Q)$ and $\sim P \vee Q$ logically equivalent? Explain your answer.

P	Q	$P \wedge \sim Q$	$\sim(P \wedge \sim Q)$	$\sim P \vee Q$
T	T	F	T	T
T	F	T	F	F
F	T	F	T	T
F	F	F	T	T

Yes they are logically equivalent as the truth tables are the same.

3. Are $P \Longrightarrow Q$ and $\sim P \Longrightarrow \sim Q$ logically equivalent? Explain your answer.

P	Q	$P \Rightarrow Q$	$\sim P \Rightarrow \sim Q$
T	T	T	T
T	F	F	T
F	T	T	F
F	F	T	T

NO. They are not logically equivalent as the truth tables are different.