Math 122 In-Class Assignment 1 - Solutions

1. Complete the truth table for $(q \to \neg p) \leftrightarrow (p \wedge \neg r)$.

p	q	r	$\neg p$	$q \to \neg p$	$\neg r$	$p \wedge \neg r$	$(q \to \neg p) \leftrightarrow (p \wedge \neg r)$
0	0	0	1	1	1	0	0
0	0	1	1	1	0	0	0
0	1	0	1	1	1	0	0
0	1	1	1	1	0	0	0
1	0	0	0	1	1	1	1
1	0	1	0	1	0	0	0
1	1	0	0	0	1	1	0
1	1	1	0	0	0	0	1

2. For this question enter your answer directly into Crowdmark to indicate whether each statement is **True** or **False**. No justification is necessary. (Hint: See the truth table you created in question 1.)

   (a) The statement $(q \to \neg p) \leftrightarrow (p \wedge \neg r)$ is a tautology.
   Solution: False. (Since the statement $(q \to \neg p) \leftrightarrow (p \wedge \neg r)$ is not always true.)

   (b) The statement $(q \to \neg p) \leftrightarrow (p \wedge \neg r)$ is a contradiction.
   Solution: False. (Since the statement $(q \to \neg p) \leftrightarrow (p \wedge \neg r)$ is not always false.)