

**Instructions:** Show all work. Answers without work can only be graded all or nothing. Partial credit is available only when work is shown.

1. If  $p$  is the statement “Manuela like oranges”, and  $q$  is the statement “The postcard is green”. Translate the logical notation into English sentences.
  - a.  $p \wedge q$

Manuela likes oranges and the postcard is green.

- b.  $p \vee \sim q$

Manuela likes oranges or the postcard is not green.

- c.  $\sim p \rightarrow q$

If Manuela doesn't like oranges then the postcard is green.

2. Use a truth table to evaluate the truth value of the compound statement  $(\sim p \vee q) \rightarrow r$ .

$p$	$q$	$r$	$\sim p$	$\sim p \vee q$	$(\sim p \vee q) \rightarrow r$
T	T	T	F	T	T
T	T	F	F	T	F
T	F	T	F	F	T
T	F	F	F	F	T
F	T	T	T	T	T
F	T	F	T	T	F
F	F	T	T	T	T
F	F	F	T	T	F

3. Use the back of the page to show that  $p \vee \sim p$  is a tautology (it is always true) using a truth table.

$p$	$\sim p$	$p \vee \sim p$
T	F	T
F	T	T