This question uses the following database:

<table>
<thead>
<tr>
<th>Variable</th>
<th>Public</th>
<th>Private</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>2</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>3</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>4</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>5</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>6</td>
<td>No</td>
<td>Yes</td>
</tr>
</tbody>
</table>

Consider the statement:

(S1) All variables that are not private are not public.

(a) State whether (S1) is true or false. If it is false, then justify your answer by citing a specific counter-example.

False, Variable 5 is a counterexample, because it is not private, but it is public.

(b) Write (S1) in precise symbolic notation.

Let \( V \) = set of all variables
Let \( P(v) = v \) is public
Let \( R(v) = v \) is private
\[
\forall v \in V, \neg R(v) \rightarrow \neg P(v)
\]

(c) Write the contrapositive of (S1) in English and in precise symbolic notation.

If a variable is public, then it is private.
Let \( V \) = set of all variables
Let \( P(v) = v \) is public
Let \( R(v) = v \) is private
\[
\forall v \in V, P(v) \rightarrow R(v)
\]