

Math 131 - Dr. Miller - Activity #5: Quantifier True/False with Tarski's World

Use the following Tarski World to answer the questions that follow; unempty boxes contain first the letter name of the object, and then a verbal description since I can't print in color. For instance, the top left box contains a blue triangle whose name is *A*.

<i>A</i> blue $\triangle$	<i>C</i> blue $\circ$			<i>J</i> blue $\triangle$
	<i>D</i> gray $\circ$	<i>F</i> gray $\heartsuit$		
<i>B</i> red $\triangle$		<i>G</i> gray $\triangle$	<i>I</i> gray $\heartsuit$	
	<i>E</i> gray $\triangle$			<i>K</i> blue $\circ$
		<i>H</i> red $\triangle$		<i>L</i> gray $\heartsuit$

The “rules” are based on those in the book plus these: SameRow(*x*,*y*) means “*x* is in the same horizontal row as *y*.” SameColumn(*x*,*y*) is defined similarly. Below(*x*,*y*) means “*x* is below *y*” (but possibly in different rows).

For each statement below and on the next page, do FOUR things:

- (i) Rewrite the original statement as a formal, verbal statement (it starts out as formal symbolic).
- (ii) Rewrite the statement as an informal statement (you \*can\* keep letter names from the grid; they aren't variables).
- (iii) Classify the statement as true or false.
- (iv) Justify your claim with an appropriate sentence of explanation.

1.  $\exists x, Blue(x)$

2.  $\forall x, \text{Blue}(x)$

3.  $\exists x, \text{Blue}(x) \wedge \text{SameRow}(x, B)$

4.  $\forall x, \text{Blue}(x) \implies (\text{SameRow}(x, A) \vee \text{SameColumn}(x, J))$

5.  $\forall x, \text{RightOf}(x, J) \implies \text{Red}(x)$