

2. Prove that $((a \rightarrow \neg b) \wedge (a \wedge b))$ is a contradiction using a truth table.

2 pts.

a	b	$\neg b$	$a \rightarrow \neg b$	$a \wedge b$	$(a \rightarrow \neg b) \wedge (a \wedge b)$
T	T	F	F	T	F
T	F	T	T	F	F
F	T	F	T	F	F
F	F	T	T	F	F

3. x and y are variables.

3 pts.

$x \in \{\text{roses, violets, daisies}\}$

$y \in \{\text{red, green, blue, yellow, white}\}$

$T(x,y)$ is a predicate that means "x are available in the color y."

Assume: Roses are available only in red and yellow.

Violets are available only in blue.

Daisies are available only in white and yellow.

Mark each statement as TRUE or FALSE:

a. $\forall x \forall y T(x,y)$ False

d. $\exists x \neg \exists y T(x,y)$ False

b. $\forall x \neg \forall y T(x,y)$ True

e. $\exists y \neg \exists x T(x,y)$ True

c. $\neg \exists x \exists y T(x,y)$ False

f. $\forall y \exists x T(x,y)$ False