Problem Set 04: PL Trees (Answers)

- 1. Use a tree to test whether the following are contraries. If they are not, then read a countermodel off the tree.
 - (a) $((Q \lor \neg P) \lor Q), \neg (P \to Q)$
 - (b) Answer:

$$((Q \lor \neg P) \lor Q) \checkmark$$

$$\neg (P \to Q) \checkmark$$

$$P$$

$$\neg Q$$

$$o$$

$$(Q \lor \neg P) \checkmark Q$$

$$o$$

$$x$$

$$Q \neg P$$

$$x \quad x$$

$$\neg (((Q \lor \neg P) \lor Q) \land \neg (P \to Q)) \checkmark$$

$$\neg (Q \lor \neg P) \checkmark \qquad (P \to Q) \checkmark$$

$$\neg (Q \lor \neg P) \checkmark \qquad (P \to Q) \checkmark$$

$$\neg (Q \lor \neg P) \checkmark \qquad (P \to Q) \checkmark$$

$$\neg Q \qquad o$$

$$\neg Q \qquad o$$

$$\neg Q \qquad \neg P \qquad Q$$

$$\neg \neg P \checkmark \qquad o$$

$$o$$

$$o$$

- 2. Use a tree to test whether the following argument is valid. If it is not, then read a countermodel off the tree.
 - (a) $((\neg A \land (B \rightarrow C)) \lor (C \lor A)), ((C \leftrightarrow A) \land A), (C \leftrightarrow (A \rightarrow C))$
 - (b) Answer:

