

### 3.8.1. Expressive Power Problems

1. Show that the language  $\{\rightarrow\}$  can build a sentence with the same truth table as  $“(P \vee Q)”$ .
2. Show that the language  $\{\vee, \leftrightarrow\}$  can build a sentence with the same truth table as  $“(P \wedge Q)”$ .
3. Show that the language  $\{\rightarrow, \leftrightarrow\}$  can build a sentence with the same truth table as  $“(P \wedge Q)”$ .  
*(Hint: use the answers to Problems 1 and 2)*
4. Show that the language  $\{\wedge, \rightarrow\}$  can build a sentence with the same truth table as  $“(P \leftrightarrow Q)”$ .
5. Show that the language  $\{\wedge, \leftrightarrow\}$  can build a sentence with the same truth table as  $“(P \rightarrow Q)”$ .

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