

**R 13.1** Professor Amongus has shown that a decision problem  $L$  is polynomial-time reducible to an NP-complete problem  $M$ . Moreover, after 80 pages of dense mathematics, he has also just proven that  $L$  can be solved in polynomial time. Has he just proven that  $P=NP$ ? Why or why not?

R 13.3 Show that the problem SAT is NP-complete; SAT takes an arbitrary Boolean formula  $S$  as input and asks if  $S$  is satisfiable,.

R-13.13 Is there a subset of the numbers in  $\{23, 59, 17, 47, 14, 40, 22, 8\}$  that sums to 100? What about 130? Show your work.