

## Problem Set 4 – revised version

<b>Please turn in each problem on a separate page with your name.</b>
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1. Book, 7.12 . [ $MODEXP \in P$ ]
2. Book, 7.14 . [P is closed under star]
3. Book, 7.17 . [if  $P = NP$  then nearly all in P are NP-complete]
4. Book, 7.26 . [ $PUZZLE$  is NP-complete]
5. Book, 7.32 . [ $U$  is NP-complete]  
NOTE: The book has a typo on this problem. It should say “NTM  $M$ ” instead of “TM  $M$ ”.
6. Book, 7.37 . [if  $P = NP$  then can factor in polynomial time]
- 7.\* Book, 7.49 . [resolution and  $2SAT$ ]