Fall 2026, Math 296: Week 6 Preliminary Problems
Due: Thursday, October 1st, 2026
A Few More Proof Methods

Preliminary problems. These problems should be completed before discussion on Thursday.

(P1) Consider the following theorem.

Theorem. *For every $n \in \mathbb{Z}$, the following are equivalent:*
(a) n is even; (b) $n+1$ is odd; (c) $n-1$ is odd; and (d) $n+2$ is even.

For each of the following, write "valid" if proving the specified list of statements would constitute a valid proof, and write "invalid" next to each list that would not.

_____ (a) $\Rightarrow$ (c), (b) $\Rightarrow$ (d), (c) $\Rightarrow$ (b), (d) $\Rightarrow$ (a)

_____ (a) $\Rightarrow$ (b), (b) $\Rightarrow$ (c), (c) $\Rightarrow$ (a), (a) $\Rightarrow$ (d), (d) $\Rightarrow$ (b)

_____ (a) $\Rightarrow$ (b), (b) $\Rightarrow$ (a), (c) $\Rightarrow$ (d), (d) $\Rightarrow$ (c), (d) $\Rightarrow$ (b)

_____ (a) $\Rightarrow$ (b), (b) $\Rightarrow$ (d), (d) $\Rightarrow$ (c), (a) $\Rightarrow$ (c)