

1.

This proves the rule is not sound because the conclusion $A \rightarrow C$ does not logically follow from the premises $A \rightarrow B$ and $C \rightarrow B$. This is not an example of Reflexivity, Augmentation, or Transitivity. It could have worked if the premises were $A \rightarrow B$ and $B \rightarrow C$.

2.

a)

result = B

B \rightarrow D : result = BD

D \rightarrow A: result = BDA

A \rightarrow BCD: result = BDAC

BC \rightarrow DE: result = BDACDE

$B^+ = \text{BDACDE}$

b)

By augmenting $D \rightarrow A$ with G, to get $DG \rightarrow AG$, and augmenting $A \rightarrow \text{BCD}$ with G, to get $AG \rightarrow \text{BCDG}$.

Then with transitivity with $DG \rightarrow AG$ and $AG \rightarrow \text{BCDG}$, we can get $DG \rightarrow \text{BCDG}$.

Transitivity $A \rightarrow \text{BCD}$, and $BC \rightarrow DE$, we can get $A \rightarrow DE$

3.

When looking at which RAID level better supports this operation with the least amount of interference between the rebuild and ongoing disk accesses, it should be RAID 5. The reason I say this is because RAID 6 is similar to RAID 5 but has better data protection than it, but at a higher cost. By storing two error correction blocks (P, Q) instead of a single parity block to guard against multiple disk failures which means it would have a bigger amount of interference between the rebuild and ongoing disk accesses. And when looking at RAID 1, it is not useful since the data safety is important. And for RAID 4, RAID 5 is better because it avoids the bottleneck of a single parity disk.

4.

The problem this arrangement will cause is that if there is any disk failures, there will almost be no chance to recover the data, and this arrangement where a parity block is after 4 data blocks, it increases the risk that both data and its parity could be lost together

5.

a)

The information in record 11 will be deleted and the record 11's location would be added to the end of the free list, indicating that the space is now available for new records when being added.

b)

This new record would be placed in the first available location specified by the free list which is record 1. It will now update the free list to remove the location of record 1 and the free list will now begin and the next input which is record 4.