3) Interventions were deleted via rule 3 when no active paths existed between intervention and outcome + Rule 3 was directly applied when no active paths were present.

- Observations were deleted via rule 1 when inactive paths between observation and outcome were found
- Rule 1 simplified queries by removing unnecessary observations.
- Exercise demonstrated how rule 3 removes interventions with no active paths and rule 1 simplifies queries by eliminating unnecessary observations (ref rules of Do Calc)

5) Rules of Do Calculus

1. If there is no active path between the intervention variable (ˆx) and the outcome (y), then we can directly remove the intervention.
2. If all active paths between the intervention variable (ˆx) and the outcome (y) are blocked by observing a descendant of the intervention variable, we can condition on that descendant and remove the intervention.
3. If there is at least one unblocked active path between the intervention variable (ˆx) and the outcome (y), then the intervention is non-identifiable.

So since the 1st rule essentially says that you cannot have a set of independent parents, can write as since for 3, remove all of the backdoor paths (Y → W → X → Y)

6) P (y|ˆx, z1) = P (y|ˆx, z1) NOT infinite recursion but a trivial identity

- states that the P(y|^x, z1) == to itself, since first part of the identity in Sol 2 == 1 as a total sum of the probability
- $\sum_{y'} P(z_3|\hat{x}, z_1, y')P(y'|\hat{x}, z_1)$ → this one specifically means that it is inclusive in P(y|x^,z3, z1)

7) P (y|ˆx, z1) = P (y, z1|ˆx) / P (z1|ˆx)

- decomposition of joint probabilities P(A and B given C), invert identity to express P (y|ˆx, z1) as P (y, z1|ˆx) / P (z1|ˆx)

8) Not sure how to proceed here but so far