Philosophy 12: Introduction to Causal Reasoning
Confounding answer key

1. Answer: D If we think that SPANKING has a causal influence on CRIMINAL ACTIVITY, then any causal factor that is a common cause of both SPANKING and CRIMINAL ACTIVITY might be a variable that confounds the association between SPANKING and CRIMINAL ACTIVITY. Any or all of the education level of the parents, the income level of the parents, and the genetic disposition to violence might be common causes of both parents spanking their children and a child's disposition to become a criminal.

2. Answer: A and B Remember that a variable is a confounder if it is a common cause of X and Y. Variables that are mediators are not confounders. Variables that are common effects are not confounders.

3. Answer: B and C Remember that no variable is a confounder of its own association with another variable. Remember that confounders are common causes, not common effects. Since confounders are common causes, you need to make sure you select all of the common causes.

4. Answer: B and C Remember that you should control for the variables that are confounders of the association between X and Y.

5. Answer: B and C If you want the correct association between X and Y, you shouldn't control for either X or Y. Z_3 is not a confounder or part of the causal connection between X and Y, so we don't need to control for it. Remember that we control for a confounder by blocking the causal connection between X and Y formed by the confounder. There are two different ways to block the causal connection in this graph.

6. Answer: B "Controlling for a confounder" is not a case of intervening on the confounder, but just conditioning on it. We don't change the value of the confounder, we just look at sub-populations that all share a particular value of the confounder.

7. If you want the correct association between X and Y, you shouldn't control for either X or Y. Remember that we need to make sure that we don't control for a mediator, since that might lead us to claim that X is not a cause of Y when it actually is. Confounders are common causes, so we need to control for each of the common causes. In this case, there is only one common cause: Z_1. .

8. Answer: C and D Remember that we don't want to control for a mediator, and so we need to make sure not to condition on a variable that is a mediator *on any path*. Controlling for a common effect produces an association, and so we do not want to condition on them. Remember that we can sometimes condition on more than one variable on a particular causal connection. Remember that we just need to block every causal connection for a confounder.

9. Answer: A To know the effect on B of an intervention, we need to estimate the causal influence of A on B, so we just need to control for the confounders.