Sketchy key for Practice Exam 3, Econ 311

More detailed answers are expected for actual exam

1. See equation (4) of slides for lecture 6

2. See page 11 of slides for lecture 6. If the null hypothesis of homoskedasticity is rejected, we need to use either robust standard error for OLS or try WLS

3. $$E(\tilde{X}) = \frac{1}{3}E(X_1) + \frac{2}{3}E(X_2) = \frac{1}{3}8 + \frac{2}{3}8 = 8$$
$$var(\tilde{X}) = \frac{1}{3^2}var(X_1) + \frac{2^2}{3^2}var(X_2) = \frac{1}{9}4 + \frac{4}{9}1 = \frac{8}{9}$$

4. False. The coefficient has nothing to do with heterskedasticity, which affects standard error, t value, p value, and confidence interval.

5. Time series data is obtained by observing variable over time (eg, American GDP from 2000 to 2024), whereas cross sectional data is obtained by observing many units at given time (eg, many countries' GDPs in 2024). The former is typically dependent, while the latter can be assumed to be independent

6. See page 8 of slides for lecture 7. The t value of θ in transformed equation (11) can be used to test whether long run propensity is zero: t value greater than 1.96 in absolute value leads to rejection

7. The t value of trend is 19.81, greater than 1.96, and coefficient 1.94 is positive. Yes, room is trending upward

8. After netting out the trending effect, the average room in third quarter is greater than fourth quarter by 188.24

9. $\hat{y} = 503.82 + 1.94 * 169 + (-36.14) * 1$

10. $room = \beta_0 + \beta_1 trend + \beta_2 d_3 + u$, where dummy variable d_3 equals one for the third quarter, and equals zero for the first, second, and fourth quarters

11. After netting out state fixed effects, increasing beertax by one dollar is associated with average y going down by 0.65

12. $-0.655 \pm 1.645 * 0.187$

13. See pages 17, 18 of slides for lecture 8

14. $plm(y \sim beertax + factor(year), model = "within")$

15. It is incorrect because it fails to account for correlation within each state. Cluster robust standard error and t value should be used

16. See pages 23 of slides for lecture 8