Question A:
1) $A_i = \beta_0 + \beta_1 E_i + \epsilon_i$
   $C_i = \beta_0 + \epsilon_i$

2) $A_i = \beta_0 + \beta_1 E_i + \epsilon_i$
   $C_i = \beta_0 + .0001 E_i + \epsilon_i$

3) $A_i = \beta_0 + \beta_1 E_i + \beta_2 A_i + \beta_3 S_i + \epsilon_i$
   $C_i = \beta_0 + \epsilon_i$

4) $A_i = \beta_0 + \beta_1 A_i + \beta_2 S_i + \epsilon_i$
   $C_i = \beta_0 + \epsilon_i$

5) $A_i = \beta_0 + \beta_1 A_i + \beta_2 S_i + \beta_3 E_i + \epsilon_i$
   $C_i = \beta_0 + \epsilon_i$

6) $E = Elevation - 11,000$
   $A = Age - 1$
   $S = Sun - 9$
   $A_i = \beta_0 + \beta_1 E_i + \beta_2 A_i + \beta_3 S_i + \epsilon_i$
   $C_i = \beta_0 + \epsilon_i$

7) Contrast codes:
   \[ X_1 \]
   \[ X_2 \]

   $A_i = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \epsilon_i$
   $C_i = \beta_0 + \epsilon_i$

8) $A_i = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \epsilon_i$
   $C_i = \beta_0 + \beta_1 X_1 + \epsilon_i$

9) $A_i = \beta_0 + \beta_1 X_1 + \beta_2 E_i + \beta_3 X_2 + \epsilon_i$
   $C_i = \beta_0 + \beta_1 X_1 + \beta_2 E_i + \epsilon_i$

10) $A_i = \beta_0 + \beta_1 E_i + \beta_2 S_i + \beta_3 X_1 + \beta_4 X_2 + \beta_5 A_i + \epsilon_i$
    $C_i = \beta_0 + \beta_1 E_i + \beta_2 S_i + \epsilon_i$
Question B:

1) \( A : RCA_i = b_0 + b_1 RCB_i + e_i \)
\( C : RCA_i = b_0 + e_i \)  

\( \text{PRE} = .32 \)
\( F_{1,64}^* = 30.15 \quad P < .001 \)

2) \( \overline{RCA_{\text{Basal}}} = 8.08 + .15(1) \cdot 1.55(1) = 6.68 \)
\( \overline{RCA_{\text{DRTA}}} = 8.08 + .15(1) \cdot 1.55(1) = 9.78 \)
\( \overline{RCA_{\text{Strat}}} = 8.08 + .15(2) \cdot 1.55(0) = 7.78 \)

3) \( A : RCA_i = b_0 + b_1 X_1 + b_2 X_2 + e_i \)
\( C : RCA_i = b_0 + e_i \)

\( \text{PRE} = .14 \)
\( F_{2,63}^* = 5.32 \quad P < .01 \)

4) **Slope of \( X_1 \):** .15 is the third if the difference in RCA between the Strat group and the average of the Basal and DRTA groups. (Relating back to the contrast code, the average of the Basal and DRTA groups has higher average RCA score than the Strat group).

5) \( A : RCA_i = b_0 + b_1 X_1 + b_2 X_2 + e_i \)
\( C : RCA_i = b_0 + b_1 X_1 + e_i \)  

\( \text{PRE} = .14 \)
\( F_{1,63}^* = (3.22)^2 = 10.37 \quad P < .005 \)

CONCLUSION: The RCA means between the Basal and DRTA groups are significantly different from each other such that the average RCA score of the DRTA group is higher than the average RCA score of the Basal group.

6) \( CIX_2 : \pm 1.55 \pm \sqrt{F_{1,63}^* \text{crit}} \cdot (SEb_2) \)
\( \pm 1.55 \pm \sqrt{4} \cdot (48) = \pm 1.55 \pm .96 \)

CI is between -5.02 and -1.18
7) **Type of Soil Disturbance**

<table>
<thead>
<tr>
<th></th>
<th>DRTA</th>
<th>Strat</th>
<th>Basal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contrast codes:</td>
<td>X3</td>
<td>-1</td>
<td>+1</td>
</tr>
</tbody>
</table>

\[
SSR(X3) = \frac{[(1)^2 (9.78) + (1)^2 (7.78) + (0)^2 (6.68)]^2}{22} + \frac{(1)^2}{22} + \frac{(0)^2}{22} = 44
\]

PA-PC=1; n-PA=63

\[
PRE = \frac{44}{640.50 + 44} = .064
\]

\[
F^*_{1.63} = \frac{44/1}{640.50/63} = 4.33
\]

**CONCLUSION:** The mean RCA score between the DRTA and Strat groups are significantly different such that the average RCA score in the DRTA group is higher than the average RCA score of the Strat group.

8) PRE=1 - .9653= .035

\[
F^*_{2.63} = \frac{0.035/2}{.9653/63} = 1.14
\]

\[
P > .05
\]

9) The coefficient of X2 differs between model2 and 3 because of redundancy between the contrast codes and RCB

**interpretation of X2 slope:** controlling for RCB, as we move from the average of the Basal and DRTA groups to the Basal group, the average RCA score drops by 1.81

OR:

Controlling for RCB, -1.81 is half the difference in the average RCA scores between the Basal and the DRTA groups.