Question A

1. \( W_1 = (\text{Baseline} - \text{Post}) / 2^{**.5} \)
\( W_2 = (\text{Baseline} - \text{Followup}) / 2^{**.5} \)
\( X_1 = -2 \) if control, 1 if CBT or CBTAA
\( X_2 = 0 \) if control, -1 if CBT, 1 if CBTAA

**W1 Regression**
proc reg;
model W1 = X1 X2/ss2 pcorr2 tol;
run;

**W2 Regression**
proc reg;
model W2 = X1 X2/ss2 pcorr2 tol;
run;

2. A test of the intercept in the W1 model
3. A test of X1 in the W1 model
4. A test of X2 in the W1 model
5. A test of X1 in the W2 model
6. A test of X2 in the W2 model
7. The \( \delta \) weights were:

<table>
<thead>
<tr>
<th></th>
<th>Baseline</th>
<th>Followup</th>
<th>Post</th>
</tr>
</thead>
<tbody>
<tr>
<td>W1(( \delta_1 ))</td>
<td>1</td>
<td>0</td>
<td>-1</td>
</tr>
<tr>
<td>W2(( \delta_2 ))</td>
<td>1</td>
<td>-1</td>
<td>0</td>
</tr>
</tbody>
</table>

If the two within-subject codes are orthogonal, then \( \sum \delta_{1k} \delta_{2k} = 0 \). However,
\( \sum \delta_{1k} \delta_{2k} = (1)(1) + (0)(-1) + (-1)(0) = 1 \)
Therefore, the within-subject codes are not orthogonal.

8. |         | Control | CBT | CBTAA |
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<thead>
<tr>
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<tbody>
<tr>
<td>X3</td>
<td>0</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>X4</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
</tbody>
</table>

proc reg;
model W1 = X3 X4;
run;

The coefficient to be tested is the intercept.

9. A: \( \text{BATT} = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \varepsilon_i \)
C: \( \text{BATT} = \beta_0 + \varepsilon_i \)
10. A: \( W_1 = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 \text{BATT} + \beta_4 X_1 \times \text{BATT} + \beta_5 X_2 \times \text{BATT} + \varepsilon_i \)
   C: \( W_1 = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 \text{BATT} + \beta_5 X_2 \times \text{BATT} + \varepsilon_i \)

**Question B**

1. The mean accuracy of the average participant is:
   \[
   \frac{\text{dom1} + \text{dom2} + \text{dom3} + \text{non1} + \text{non2} + \text{non3}}{6} = \frac{9.78}{6} = 1.63
   \]

2. A: \( \text{SUM} = \beta_0 + \beta_1 \text{ORDER} + \varepsilon_i \)
   C: \( \text{SUM} = \beta_0 + \varepsilon_i \)
   \[
   \text{PRE} = .0263
   \]
   \[
   F(1,16) = .43
   \]
   \[
   p = .5201
   \]
   The evidence suggests that accuracy did not depend on which hand participants threw with first.

3. A: \( \text{DOMVSNONDOM} = \beta_0 + \beta_1 \text{ORDER} + \varepsilon_i \)
   C: \( \text{DOMVSNONDOM} = 0 + \beta_1 \text{ORDER} + \varepsilon_i \)
   \[
   \text{PRE} = \frac{\text{SSR}}{\text{SSR} + \text{SSEa}}
   \]
   \[
   \text{SSR} = n(\beta_0)^2
   \]
   \[
   = 18(1.78)^2
   \]
   \[
   = 57.03
   \]
   \[
   \text{SSEa} = 120.89
   \]
   \[
   \text{PRE} = \frac{57.03}{57.03 + 120.89} = .32
   \]
   \[
   F(1,16) = (2.74)^2 = 7.50
   \]
   \[
   p = .0144
   \]
   Accuracy was greater when participants threw with their dominant hand than with their non-dominant hand.

4. A: \( \text{DOMVSNONDOM} = \beta_0 + \beta_1 \text{ORDER} + \varepsilon_i \)
   C: \( \text{DOMVSNONDOM} = \beta_0 + \varepsilon_i \)
   \[
   \text{PRE} = \frac{\text{SSR}}{\text{SSR} + \text{SSEa}}
SSR = n(\beta_i)^2
   = 18(-1.11)^2
   = 22.18

SSEa = 120.89
PRE = \frac{22.18}{22.18 + 120.89} = .155

F(1,16) = (-1.71)^2 = 2.924
p = .1056

The difference in accuracy between dominant and nondominant hand did not
depend on which hand the participants threw with first.

5. A: LINEAR = \beta_0 + \beta_1 ORDER + \varepsilon_i
   C: LINEAR = 0 + \beta_1 ORDER + \varepsilon_i

   PRE = \frac{SSR}{SSR + SSEa}

SSR = n(\beta_0)^2
   = 18(.78)^2
   = 10.89

SSEa = 95.11
PRE = \frac{10.89}{10.89 + 95.11} = .103
F(1,16) = (1.35)^2 = 1.823
p = .1947

On average, accuracy of scores does not improve linearly across the set of three
throws.

6. A: LINEARINT = \beta_0 + \beta_1 ORDER + \varepsilon_i
   C: LINEARINT = 0 + \beta_1 ORDER + \varepsilon_i

   PRE = \frac{SSR}{SSR + SSEa}

SSR = n(\beta_0)^2
   = 18(-.33)^2
   = 2

SSEa = 76.44
The extent to which there is linear improvement in throwing accuracy does not depend on the hand used to throw.

7. A: \[ \text{LINEARINT} = \beta_0 + \beta_1 \text{ORDER} + \epsilon_i \]
   C: \[ \text{LINEARINT} = \beta_0 + \epsilon_i \]

\[ \text{PRE} = \frac{\text{SSR}}{\text{SSR} + \text{SSEa}} \]

\[ \text{SSR} = n(\beta_1)^2 \]
\[ = 18(-.556)^2 \]
\[ = 5.56 \]

\[ \text{SSEa} = 76.44 \]

\[ \text{PRE} = \frac{5.56}{5.56 + 76.44} = .0678 \]

\[ \text{F}(1,16) = (-1.08)^2 = 1.16 \]
\[ p = .2969 \]

The strength of the interaction does not depend on the hand participants threw with first.

8. \[ \text{DOMVSNONDOM} = 1.778 - 1.11 \text{ORDER} \]
   ORDER = -1 if participant threw first with their nondominant hand

\[ \text{DOMVSNONDOM} = 1.778 - 1.11(-1) \]
\[ \text{DOMVSNONDOM} = 1.778 + 1.11 \]
\[ \text{DOMVSNONDOM} = 2.89 \]

The difference in accuracy between dominant and nondominant hands for this group is predicted to be 2.889, with accuracy greater for the dominant hand than for the nondominant hand.