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Question 5

(a) Weight capacity:  $600(X_{11} + X_{21} + X_{31} + X_{41} + X_{51} + X_{61}) + 750(X_{12} + X_{22} + X_{32} + X_{42} + X_{52} + X_{62}) \geq 200 + 180 + 310 + 80 + 120 + 60$

Box capacity:  $X_{11} + X_{21} + X_{31} + X_{41} + X_{51} + X_{61} \leq 4$

$$X_{12} + X_{22} + X_{32} + X_{42} + X_{52} + X_{62} \leq 5$$

$$X_{12} + X_{22} + X_{32} + X_{42} + X_{52} + X_{62} + X_{11} + X_{21} + X_{31} + X_{41} + X_{51} + X_{61} = 6$$

$$X_{12} + X_{22} + X_{32} + X_{42} + X_{52} + X_{62} = X_{11} + X_{21} + X_{31} + X_{41} + X_{51} + X_{61}$$

(b) Let  $d_1^+, d_1^-$  be the deviations for weight loaded by truck 1 from 445 (half of the total weight of boxes)

Let  $d_2^+, d_2^-$  be the deviations for weight loaded by truck 2 from 445 (half of the total weight of boxes)

Let  $d_3^+, d_3^-$  be the deviations for number of boxes loaded by truck 1 from 3(half of the total number of boxes)

Let  $d_4^+, d_4^-$  be the deviations for number of boxes loaded by truck 2 from 3(half of the total number of boxes)

$$600(X_{11} + X_{21} + X_{31} + X_{41} + X_{51} + X_{61}) - d_1^+ + d_1^- = 445$$

$$750(X_{12} + X_{22} + X_{32} + X_{42} + X_{52} + X_{62}) - d_2^+ + d_2^- = 445$$

$$X_{12} + X_{22} + X_{32} + X_{42} + X_{52} + X_{62} - d_3^+ + d_3^- = 3$$

$$X_{12} + X_{22} + X_{32} + X_{42} + X_{52} + X_{62} = 3$$

(3) Minimize  $d_1^+ + d_1^- + d_2^+ + d_2^- + d_3^+ + d_3^- + d_4^+ + d_4^-$