STAT 510 Homework 9

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1. (a)

	geno		
fert	1	2	3
0	125	140	115
50	141.25	156.25	141.25
100	150	165	160
150	151.25	166.25	171.25

(b) Not true.

(c) Not true.

(d) Not true.

(e) Geno Type 1:

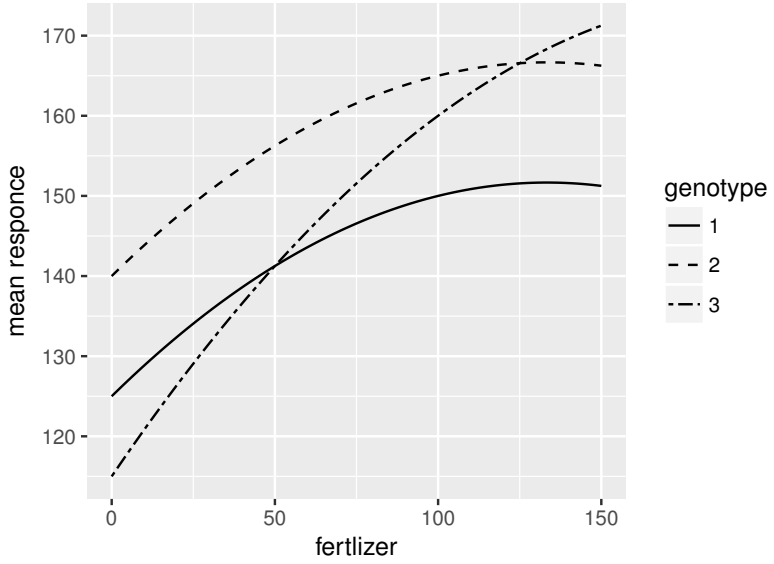
$$E(y) = 125 + 0.4f - 0.0015f^2$$

Geno Type 2:

$$E(y) = 140 + 0.4f - 0.0015f^2$$

Geno Type 3:

$$E(y) = 115 + 0.6f - 0.0015f^2$$



(f) $\bar{y}_{11\cdot} - \bar{y}_{12\cdot} = -13.75$, $SE = \sqrt{\frac{\hat{\sigma}_e^2}{2}} = \frac{6.30128}{\sqrt{2}}$.
$CI = (\bar{y}_{11\cdot} - \bar{y}_{12\cdot} - SE \cdot t_{27,0.975}, \bar{y}_{11\cdot} - \bar{y}_{12\cdot} + SE \cdot t_{27,0.975}) = (-22.8923, -4.607704)$.

(g) $\mu_{11} - \mu_{12} = -15 \in CI = (-22.8923, -4.607704)$.

(h) $\bar{y}_{11}-\bar{y}_{21} = -22.5$, $SE = \frac{\sqrt{\hat{\sigma}_e^2+\hat{\sigma}_w^2}}{\sqrt{2}} = \sqrt{\frac{39.70613+67.2981}{2}} = 7.314514$, $df = \frac{\left(\frac{1}{4}MS_{Block\times Geno}+\frac{3}{4}MS_{Error}\right)^2}{\frac{1}{16}\frac{MS^2_{Block\times Geno}}{6}+\frac{9}{16}\frac{MS^2_{Error}}{27}} = 8.88$.

$CI = (\bar{y}_{11\cdot} - \bar{y}_{21\cdot} - SE \cdot t_{27,0.975}, \bar{y}_{11\cdot} - \bar{y}_{12\cdot} + SE \cdot t_{8.88,0.975}) = (-39.08073, -5.919272)$.

(i) $\mu_{11} - \mu_{21} = -16.25 \in CI = (-39.08073, -5.919272)$.

(j) $SE = \frac{\hat{\sigma}_b^2}{4} + \frac{\hat{\sigma}_w^2}{12} + \frac{\hat{\sigma}_e^2}{48} = \frac{MS_{Block}}{48}$, $df = 4 - 1 = 3$.

2.