Today, in the discussion, I did two mistakes.

First, $SD(\bar{Y}_{i\cdot}) \neq$ StDev (in output of Minitab)

$$\uparrow \qquad \sqrt{\frac{1}{n_i - 1}\sum_{j=1}^{n_i}(Y_{ij} - \bar{Y}_{i\cdot})^2}$$

$$\sqrt{\frac{MSE}{n_i}} = \sqrt{\frac{SSE}{(n_T - r)\cdot n_i}} = \sqrt{\frac{1}{(n_T - r)n_i}\sum_{i=1}^{r}\sum_{j=1}^{n_i}(Y_{ij} - \bar{Y}_{i\cdot})^2}$$

Second, the multiplier t (I used t^* in discussion) should have $df = n_T - r$ (not $n_i - 1$). Furthermore, in the textbook, t^* is used as a test statistic rather than a multiplier

So the 95% CI for μ_i should be:

$$\hat{\mu}_i \pm t_{(0.975,\, n_T - r)}\, SD(\hat{\mu}_i)$$

$$= \bar{Y}_{i\cdot} \pm t_{(0.975,\, n_T - r)} \cdot SD(\bar{Y}_{i\cdot})$$

For example in 16.12,

$\bar{Y}_{1\cdot} = 38$, $MSE = 336$, $n_T = 24$, $r = 3$, $n_1 = 8$, $n_2 = 10$, $n_3 = 6$

$\therefore$ 95% CI for μ_1 is: $38 \pm t_{(0.975,\, 21)}\sqrt{\frac{336}{8}}$

Similarly, the 95% CI for $\mu_i - \mu_j$ should be

$$(\hat{\mu}_i - \hat{\mu}_j) \pm t_{(0.975,\, n_T - r)}\, SD(\hat{\mu}_i - \hat{\mu}_j)$$

For example in 16.12.

$\hat{\mu}_1 = \bar{Y}_{1\cdot} = 38$, $\hat{\mu}_2 = \bar{Y}_{2\cdot} = 32$, $SD(\hat{\mu}_1) = \sqrt{\frac{336}{8}}$, $SD(\hat{\mu}_2) = \sqrt{\frac{336}{10}}$

$\therefore$ 95% CI for $\mu_1 - \mu_2$ is: $(38 - 32) \pm t_{(0.975,\, 21)}\sqrt{\left(\sqrt{\frac{336}{8}}\right)^2 + \left(\sqrt{\frac{336}{10}}\right)^2}$

(Note $SD^2(\hat{\mu}_i - \hat{\mu}_j) = SD^2(\hat{\mu}_i) + SD^2(\hat{\mu}_j)$)