HW #6

6.4, 6.11, 6.12, 6.16, 6.21, 6.23

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6.4

(d) is true: the range cannot be smaller than 2.2 Btu/lb.

6.11

The *t*-ratio will be the same since both the estimate and standard error will be scaled by a factor of 3.

6.12

We start with a look at the means by group:

Handicap	lsmean	SE	df	lower.CL	upper.CL
Amputee	4.43	0.436	65	3.56	5.30
Crutches	5.92	0.436	65	5.05	6.79
Hearing	4.05	0.436	65	3.18	4.92
None	4.90	0.436	65	4.03	5.77
Wheelchair	5.34	0.436	65	4.47	6.21

We want to contrast the *mobility* handicaps (amputee, crutches, wheelchair) with the *communication* handicaps (hearing), so we use the linear combination

$$\begin{aligned}\gamma &= \frac{A+C+W}{3} - H \\ &= \frac{1}{3}A + \frac{1}{3}C + \frac{1}{3}W - H.\end{aligned}$$

This gives us:

contrast	estimate	SE	df	t.ratio	p.value
Mobility vs. Communication	1.18	0.504	65	2.343	0.022

This indicates that there is good evidence of a difference, though not overwhelming.

6.16

We have data with 36 subjects divided into 6 groups. For the *LSD* method, we use $n - I = 30$ degrees of freedom, so the 97.5% critical value of t_{30} (and the multiplier) is 2.042. Since the *F*-test *p*-value is large (0.085), using the *F*-protected *LSD* comparison we would declare no difference between any groups. Tukey-Kramer gives us a multiplier of $\frac{q_{6,30}(0.95)}{\sqrt{2}} = \frac{4.301}{\sqrt{2}} = 3.042$. Using Bonferroni we get $k = \frac{6(6-1)}{2} = 15$, and so we use a multiplier of $t_{30}(1 - \frac{0.05}{2k}) = t_{30}(0.9983) = 3.189$. Scheffe's multiplier is $\sqrt{(6-1)F_{5,30}(0.95)} = 3.559$

6.21

6.23