1. $\hat{Y} = 25 + 0.12x \Rightarrow b_1 = 0.12$ (positive) 1B

2. $S = \sqrt{\frac{SSE}{n-2}} = \sqrt{\frac{SST-SSR}{n-2}} = \sqrt{\frac{2500-2320}{22-2}} = 3$

$\Rightarrow S_{b1} = \frac{S}{\sqrt{\Sigma(x_i-\bar{x})^2}} = \frac{3}{\sqrt{3906.25}} = 0.048$

$t_{cal} = \frac{b_1}{S_{b1}} = \frac{0.12}{0.048} = 2.5$ 2D

$DF = n-2 = 20$

3. Critical value approach : CV : $\pm t_{\frac{\alpha}{2}} = \pm t_{0.025} = \pm 2.0860$

-2.0860 2.0860 t_{cal}

Reject H_0, there is a significant linear relationship between x and y 3A

4. $b_1 \pm t_{\frac{\alpha}{2}} S_{b1} \Rightarrow 0.12 \pm 2.0860 \times 0.048 = [0.020, 0.220]$ 4B

5. $\hat{Y} = 25 + 0.12 \times 160 = 44.2$ 5A

6. $r^2 = \frac{SSR}{SST} = \frac{2320}{2500} = 0.928$: 92.8% of the variation in y can be explained by the variation in x 6C

7. $S_{\hat{y}p} = S\sqrt{\frac{1}{n} + \frac{(x_p-\bar{x})^2}{\Sigma(x_i-\bar{x})^2}} = 3 \times \sqrt{\frac{1}{22} + \frac{(160-169.9)^2}{3906.25}} = 0.797$

$\Rightarrow 44.2 \pm 2.0860 \times 0.797 = [42.54, 45.86]$ 7C

8-9

f_{ij}	e_{ij}	$(f_{ij}-e_{ij})^2/e_{ij}$
150	$\frac{396*250}{750} = 132$	$(150-132)^2/132$
150	$\frac{396*300}{750} = 158.4$	$(150-158.4)^2/158.4$
96	$\frac{396*200}{750} = 105.6$	$(96-105.6)^2/105.6$
100	$\frac{354*250}{750} = 118$	$(100-118)^2/118$
150	$\frac{354*300}{750} = 141.6$	$(150-141.6)^2/141.6$
104	$\frac{354*200}{750} = 94.4$	$(104-94.4)^2/94.4$

test stat $= \chi^2 = 7.993$ 8.B

9. $DF = k-1 = 2$

CV: $\chi^2_\alpha = \chi^2_{0.01} = 9.210$

$\chi^2 = 7.993$ 9.210

fail to reject H_0

9-D

P-value method:

DF	0.025	0.01
2	7.378	9.210

P-value = 0.01 to 0.025 $> \alpha = 0.01$