1.(a) Since $\hat{\mu}_i \pm C\, sd(\tilde{\mu}_i) =$ the ith C.I., $C \sim N(0,1)$

$\hat{\mu}_1 = \frac{70+80}{2} = 75 \qquad \hat{\mu}_2 = \frac{68+72}{2} = 70 \qquad \hat{\mu}_3 = \frac{64+70}{2} = 67$

$sd(\tilde{\mu}_1) = \frac{5}{1.96} \qquad sd(\tilde{\mu}_2) = \frac{2}{1.96} \qquad sd(\tilde{\mu}_3) = \frac{3}{1.96}$

Since each section has the same number of students

$W_1 = W_2 = W_3 = \frac{1}{3}$

$\hat{\mu} = w_1 \hat{\mu}_1 + w_2 \hat{\mu}_2 + w_3 \hat{\mu}_3 = 70.67$

$Var(\tilde{\mu}) = \frac{1}{9} \sum_{i=1}^{n} Var(\tilde{\mu}_i) = 1.099$

A 95% C.I. is $\hat{\mu} \pm C\sqrt{Var(\tilde{\mu})}$ $\quad C \sim N(0,1)$

$= 70.67 \pm 1.96\sqrt{1.099}$

$= (68.612, 72.722)$

(b) $n_i = \frac{n \sigma_i W_i}{\sum_{j=1}^{3} \sigma_j W_j}$

since $w_1 = w_2 = w_3 = \frac{1}{3}$

$\sigma_1 W_1 = 0.85$

$\sigma_2 W_2 = 0.34$

$\sigma_3 W_3 = 0.51$

$\sum_{j=1}^{3} \sigma_j W_j = 1.7$

Hence $\frac{n_1}{n} = 0.5$