8.62

a) $SE = \sqrt{\frac{7.1^2}{34} + \frac{8.1^2}{41}}$

$\mu_1 - \mu_2 = 24.8 - 21.3 = 3.5$

σ unknown but $34 + 41 > 30$

use $z_{\frac{.01}{2}} = 2.58$

$(\bar{x}_1 - \bar{x}) \pm z_{\frac{.01}{2}} SE$

$(-1.03, 8.03)$

b) 99% confidant that interval $(-1.03, 8.03)$ contains true diff. in means. It includes 0, so there is not significant evidence of different means

8.70

a) $\alpha = 0.05$, $z = 1.96$

$p = 0.9$

$$\frac{.05}{\sqrt{\frac{.9 \cdot .1}{n}}} = 1.96$$

$$\frac{\sqrt{n}}{\sqrt{.9 \cdot .1}} = \frac{1.96}{.05}$$

$$n = \left[\frac{1.96^2}{.05^2} (.9 \cdot .1) \right] = \boxed{139}$$

b) $$n = \left[\frac{1.96^2}{.05^2} \cdot .25 \right] = \boxed{385}$$

8.80

$n = 21 \quad \bar{y} = 26.6 \quad s = 7.4$

$df = 20$

$t_{\frac{.05}{2}, 20} = 2.09$

$$26.6 \pm 2.09 \cdot \frac{7.4}{\sqrt{21}}$$

$$(23.23, 29.27)$$

9.91

a) $\bar{x} = 446$ $\quad$ $\bar{y} = 534$

$s = 42$ $\quad$ $s = 45$

$n = 15$ $\quad$ $n = 15$

$$s_p = \sqrt{\frac{14 \cdot 42^2 + 14 \cdot 45^2}{28}} \approx 43.53$$

$t^*_{.05,28} = 2.05$

$$(446 - 534) \pm 2.05 \cdot \frac{43.53}{\sqrt{30}}$$

$$\boxed{(-104.3, -71.7)}$$

c) We are 95% conf. that the true diff. in Verbal scores between Engineering & Lit. students is in the interval

$(-104.3, -71.7)$

Significant evidence of a difference of means. 0 is not included

b) $\bar{x} = 548$ $\quad$ $\bar{y} = 517$

$s = 57$ $\quad$ $s = 52$

$n = 15$ $\quad$ $n = 15$

$s_p = 54.56$

$$(548 - 517) \pm 2.05 \cdot \frac{54.56}{\sqrt{30}}$$

$$\boxed{(10.6, 51.4)}$$

c) We are 95% conf. that the true diff. in Math scores between Engineering & Lit. students is in the interval $(10.6, 51.4)$

Significant evidence of a difference of means. 0 is not included

d) Independence

8.95

$\bar{x} = 85.74$

$s^2 = \frac{1}{5}\left((85.4-\bar{x})^2 + (86.8-\bar{x})^2 \ldots\right)$

$= 0.5$

$df = 6-1 = 5$

$X_{1-\frac{1}{2},5} = 1.14$ $\quad$ $X_{\frac{1}{2},5} = 11.07$

$\frac{5 \cdot 0.5}{1.14} = 2.18$ $\quad$ $\frac{5 \cdot 0.5}{11.07} = 0.23$

$\sigma^2 \in (1.141, 11.07)$