

10.

$$(1) \mu_1 - \mu_2 = \bar{x} - \bar{y} = 85 - 78 = 7$$

$$(2) 1 - \alpha = 0.9, \frac{\alpha}{2} = 0.05, z_{0.05} = 1.645$$

$\therefore \mu_1 - \mu_2$ 的 90% 信頼区間は

$$(\bar{x} - \bar{y}) \pm z_{\frac{\alpha}{2}} \sqrt{\frac{\sigma_1^2}{n_1} + \frac{\sigma_2^2}{n_2}}$$

$$= (85 - 78) \pm 1.645 \sqrt{\frac{154}{50} + \frac{146}{40}}$$

$$= 7 \pm 1.645 \times 2.59$$

$$\Rightarrow (2.74, 11.26)$$

11.

| | | | | | | | |
|-------------|----|----|----|----|----|----|----|
| | 1. | 2. | 3. | 4. | 5. | 6. | 7. |
| d_i | -7 | -6 | 4 | -4 | -3 | -5 | 4 |
| $x_i - y_i$ | | | | | | | |

$$n = 7, \bar{d} = -2.43$$

$$1 - \alpha = 0.9$$

$$t_{\frac{\alpha}{2}}(n-1) = t_{0.05}(6) = 1.943$$

$$S_D = \sqrt{\frac{\sum (d_i - \bar{d})^2}{n-1}} = \sqrt{\frac{\sum d_i^2 - n\bar{d}^2}{n-1}}$$

$$= \sqrt{\frac{167 - 7 \times (-2.43)^2}{6}} = 4.58$$

$\mu_1 - \mu_2$ 的 90% 信頼区間は

$$\bar{d} \pm t_{\frac{\alpha}{2}}(n-1) \frac{S_D}{\sqrt{n}} \Rightarrow (-2.43) \pm 1.943 \times \frac{4.58}{\sqrt{7}}$$

$$\Rightarrow (-5.79, 0.93)$$