7.

$e = z_{\frac{\alpha}{2}} \frac{\sigma}{\sqrt{n}}$

(1)

$\sigma = 3$, $e = 0.5$ $1-\alpha = 0.95$

$n = \left(\frac{3}{0.5}\right)^2 \times 1.96^2 = 138.3 \fallingdotseq 139$ #

(2) $\sigma = 0.2$, $e = 0.03$, $1-\alpha = 0.9$

$n = \left(\frac{0.2}{0.03}\right)^2 \times 1.645^2 = 120.27 \fallingdotseq 121$ #

(3)

$\sigma = 0.05$, $e = 0.02$, $1-\alpha = 0.98$

$n = \left(\frac{0.05}{0.02}\right)^2 \times 2.326^2 = 33.8 \fallingdotseq 34$ #

6.

$1250 \pm z_{0.025}\sqrt{\frac{140^2}{120}} = 1250 \pm 25.05 \Rightarrow (1224.95, 1275.05)$ #

10.

(1)

$\mu_1 - \mu_2 = \bar{x} - \bar{y} = 85 - 78 = 7$ #

(2)

$7 \pm 1.645\sqrt{\frac{154}{50} + \frac{46}{40}}$

$= 7 \pm 1.645 \times 2.59$

$= 7 \pm 4.26$

$\Rightarrow (2.74, 11.26)$ #