2. (114.4, 115.6) is the 90% confidence interval because the interval is smaller, which means the confidence level is lower

3. a. Critical value: $z_{0.01/2} = z_{0.005}$

$X \sim N(1.01, 0.18)$

$\Phi(2.57) = 0.995$

$1.01 \pm 2.57\sqrt{\frac{0.18^2}{35}}$ gives CI $(0.931, 1.088)$

b. The control department should

4, $\hat{\theta} = 0.4$, $n = 1082$

$\alpha = 0.1$

$\Phi(1.65) = 0.95$

$z_{60\%} = 1.65$

$$\frac{\left(0.4 + \frac{1.65^2}{2 \cdot 1082}\right) \pm 1.65\sqrt{\frac{0.4(1-0.4)}{1082} + \frac{1.65^2}{4(1082)^2}}}{1 + \frac{1.65^2}{1082}}$$

gives $(0.376, 0.425)$

5. $\alpha = 0.1 \quad n-1 = 5$

$$s = \sqrt{\frac{(4.9493)^2 + (5.1 - 4.9333)^2 \ldots}{5}} = 0.137$$

$$t_{0.05,5} = 2.015$$

$$\bar{x} = 4.93$$

$$4.93 \pm 2.015\sqrt{\frac{0.137^2}{6}}$$

gives $(4.817, 5.043)$