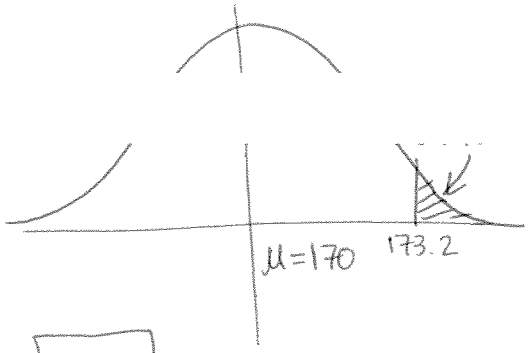
Pre-Class Solutions for 26 Feb

4.3

② a) $z = \dfrac{\bar{x} - \mu}{\sigma/\sqrt{n}} \geq 1.645$ ← we can reject at $\alpha = 0.05$

$\bar{x}$ is test statistic $\quad \dfrac{\bar{x} - 170}{10/\sqrt{25}} \geq 1.645$



$\text{critical} = \mu + z_{0.05}\left(\frac{\sigma}{\sqrt{n}}\right) = 170 + 1.645\left(\frac{10}{5}\right) = \boxed{173.2}$

b) sample mean = $172.52 = \bar{x}$

$\dfrac{\bar{x} - 170}{10/\sqrt{25}} = 1.26$ $\quad$ $1.26 < 1.645$, so fail to reject alternative hypothesis

④ a) $z\text{-value} = \dfrac{\bar{x} - \mu}{\sigma/\sqrt{n}} = \dfrac{510.77 - 530}{90/30} = -1.282$

$P(z < -1.282) = \boxed{0.10}$ $\quad \alpha = 0.10$ $\quad$ 10% significance

⑥ a) $\bar{x}_{\text{sample}} = 667.92$

$\bar{x}_{\text{sample}} < \bar{x}_{\text{critical}}$ (668.94), so we can reject H_0.

b) $z_{\text{critical}} = \dfrac{\bar{x}_{\text{critical}} - \mu}{\sigma/\sqrt{n}} = \dfrac{668.94 - 715}{140/\sqrt{25}} = -1.645$

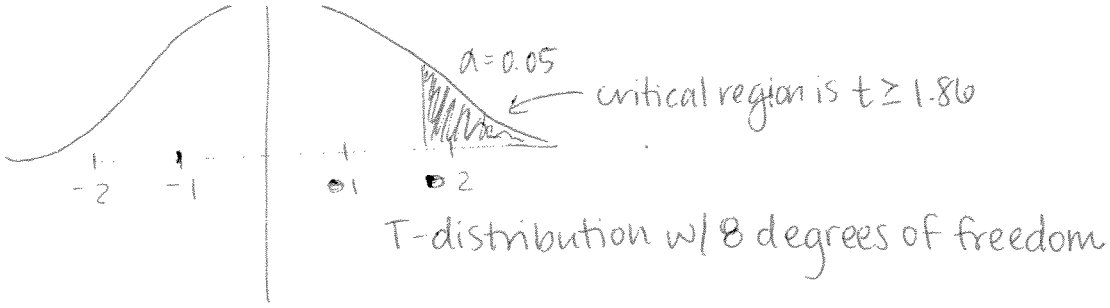
This is a 95% significant test, $\boxed{\alpha = 0.05}$

4.4

② a) $H_0: \mu = 3.4$ b) $H_1: \mu > 3.4$

c) $t = \frac{\bar{x} - 3.4}{s/\sqrt{9}}$ $r = n-1 = 9-1 = 8$ degrees of freedom

d) $t_{0.05}(8) = 1.86$



T-distribution w/ 8 degrees of freedom

e) $\bar{x} = 3.556$ $s = 0.167$ $t = \frac{\bar{x} - 3.4}{s/\sqrt{9}} = \frac{3.556 - 3.4}{0.167/\sqrt{9}} = \boxed{2.802}$

f) $2.802 \geq 1.86$ ∴ reject H_0

g) $0.01 < \text{P-value} < 0.025$; P-value = 0.0116

④ $z_{0.05} = 1.645$ $z = \frac{\bar{x} - \mu_0}{\sqrt{s^2}/\sqrt{n}} = \frac{2.07 - 0}{\sqrt{84.63}/51} = 1.607$

$1.607 < 1.645$ ∴ fail to reject H_0