# Math 181A HW7

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**Problem 6.2.1** We reject null hypothesis if the p-value is smaller than $\alpha$.

(a)

$$z = \frac{114.2 - 120}{18/\sqrt{25}} \approx -1.61.$$

According to z-table, the p-value is $0.0537 < 0.08$. Hence, we reject $H_0$ with 92% confidence.

(b)

$$z = \frac{45.1 - 42.9}{3.2/\sqrt{16}} = 2.75.$$

According to z-table, the p-value is $0.003 < \frac{0.01}{2} = 0.005$. Hence, we reject $H_0$ with 99% confidence.

(c)

$$z = \frac{15.8 - 14.2}{4.1/\sqrt{9}} \approx 1.17.$$

According to z-table, the p-value is $0.121 < 0.13$. Hence, we reject $H_0$ with 87% confidence.

**Problem 6.2.5** Since $H_1 : \mu \neq \mu_0$ is a two-sided test, the p-value of the statistic would need to be half of that of a one-sided test for $H_1 : \mu > \mu_0$. Hence, $H_1 : \mu \neq \mu_0$ is more restrictive than $H_1 : \mu > \mu_0$. So, a favor of $H_1 : \mu > \mu_0$ does not necessarily mean a favor of $H_1 : \mu \neq \mu_0$.

**Problem 6.2.8** Already did.

**Problem 6.2.10** Let $H_0 : \mu = 120$, $H_1 : \mu > 120$, $\alpha = 0.01$.

$$z = \frac{125.2 - 120}{12/\sqrt{50}} \approx 3.06.$$

According to z-table, the p-value is $0.0011 < 0.01$. Hence, we reject $H_0$ with 99% confidence.

**Problem 6.3.3** Let $H_0 : p = 0.65$, $H_1 : p < 0.65$.

$$z = \frac{0.6 - 0.65}{\sqrt{\frac{0.65(1-0.65)}{120}}} \approx -1.15.$$

According to z-table, the p-value is $0.125 > 0.05$. Hence, we fail to reject $H_0$ with 95% confidence.

**Problem 6.3.4** For $\alpha = 0.14$, $z = 1.08$. Hence, to reject $H_0$,

$$z = \frac{p - 0.45}{\sqrt{\frac{0.45(1-0.45)}{200}}} > 1.08$$
$$p > 0.488$$
$$np > 97.6.$$

Therefore, minimum number of success is 98.

**Problem 6.3.9**

(a)

$$\alpha = \binom{7}{0}0.25^7 + \binom{7}{1}0.25^6 \cdot 0.75 + \binom{7}{2}0.25^5 \cdot 0.75^2 + \binom{7}{3}0.25^4 \cdot 0.75^3$$
$$\approx 0.071.$$

(b)