The average hourly wage of a sample of $n_1 = 150$ workers in plant A was $\overline{x_1} = \$2.56$ with a standard deviation of $s_1 = \$1.00$. The average hourly wage of a sample of $n_2 = 200$ workers in plant B was $\overline{x_2} = \$2.87$ with a standard deviation of $s_2 = \$1.20$.

Write a suitable hypothesis to test whether the wages are comparable and test it.

Solution

$$H_0: \mu_1 = \mu_2; \ H_A: \mu_1 \neq \mu_2.$$

Let the significance level $\alpha = 0.1$.

$$z = \frac{\overline{x_1} - \overline{x_2}}{\sqrt{\dfrac{s_1^2}{n_1} + \dfrac{s_2^2}{n_2}}} = \frac{2.56 - 2.87}{\sqrt{\dfrac{1.00^2}{150} + \dfrac{1.20^2}{200}}} = -2.63.$$

Rejection rule: reject H_0 if $|z| \geq z_{\alpha/2}$, i.e. $|z| \geq z_{\alpha/2}$, $|z| \geq 1.645$, that is, either $z \leq -1.645$ or $z \geq 1.645$.

We reject the null hypothesis at $\alpha = 0.1$ significance level because $z = -2.63 < -z_{\frac{\alpha}{2}} = -z_{0.05} = -1.645$.