An investigator collects data on length of time to complete an assembly procedure for two different training methods. The sample data are shown below. Is there sufficient evidence to indicate a difference in true mean times for the two methods? Test at $\alpha = 0.05$.

<table>
<thead>
<tr>
<th>Standard procedure</th>
<th>New procedure</th>
</tr>
</thead>
<tbody>
<tr>
<td>$n_1 = 9$, $\bar{x} = 35.22$, $s_1^2 = 24.45$</td>
<td>$n_2 = 9$, $\bar{y} = 31.56$, $s_2^2 = 20.03$</td>
</tr>
<tr>
<td>(in second)</td>
<td>(in second)</td>
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</tbody>
</table>

**Answer:**

$n_1 < 30$ and $n_2 < 30 \implies$ Small, independent two samples.

1. **Step 1:** $H_0: \mu_1 - \mu_2 = 0$ versus $H_0: \mu_1 - \mu_2 \neq 0$

2. **Step 2:** $\alpha = 0.05$

3. **Step 3:**

$$T = \frac{\bar{X} - \bar{Y}}{s_p \sqrt{(1/n_1) + (1/n_2)}}$$

$df = n_1 + n_2 - 2 = 16$. Rejection region: $|T| \geq t_{\alpha/2} = t_{0.05} = 2.120$

4. **Step 4:**

$$s_p^2 = \frac{(n_1 - 1)s_1^2 + (n_2 - 1)s_2^2}{n_1 + n_2 - 2} = \frac{8(24.45) + 8(20.03)}{9 + 9 - 2} = 22.24 \implies s_p = \sqrt{24.45} = 4.72$$

$$t = \frac{35.22 - 31.56}{4.72 \sqrt{(1/9) + (1/9)}} = 1.65$$

$$|t| = 1.65 < 2.120 \implies$$ Do not reject $H_0$.

5. **Step 5:**

$$t_{10} = 1.337 < 1.65 < 1.746 = t_{0.05} \implies 2(0.05) < p\text{-value} < 2(0.1) \implies .1 < p\text{-value} < .2$$