Using MINTAB to Do an Independent Samples t-Test

Use the data for Example 9.4 on Pages 387-388 in Statistics, 9th Edition by McClave and Sincich to answer the following question.

Do the data provide enough evidence to indicate that the mean reading score for slow learners taught by the new method is greater than the mean reading score for slow learners taught by the standard method?

First Step: State the research hypothesis.

Hₐ: The mean reading score for slow learners taught by the new method is greater than the mean reading score for slow learners taught by the standard method. (µₙₑ𝑤 > µₛᵗₐₜᵈᵃｒｄ)

Second Step: Define µ₁ - µ₂.

There are two ways to define µ₁ - µ₂.

Either µ₁ - µ₂ = µₙₑ𝑤 - µₛᵗₐₜᵈᵃʳｄ or µ₁ - µ₂ = µₛᵗₐₜᵈᵃʳᵈ - µₙₑ𝑤.

Hence our research hypothesis will be either

µₙₑ𝑤 - µₛᵗₐₜᵈᵃʳᵈ > 0 or µₛᵗₐₜᵈᵃʳᵈ - µₙₑ𝑤 < 0.

Third Step: Choose the correct MINITAB command to run your test.

How do we tell MINITAB what we have chosen to do?

MINITAB uses the TWOS command to test this type of hypothesis.

The order of the columns on the TWOS command line indicates the which group is group 1 and which is group 2.

The subcommand alternative indicates whether the test is a two-tailed test (0), an upper-tailed test (1) or a lower-tailed test (-1).

The subcommand pooled indicates that you are assuming the populations have equal variances.
For each TWOS command below, give the mathematical version of the research hypothesis being tested.

1)
MTB > name c1 'new' c2 'standard'
MTB > twos c1 c2;
SUBC> alternative 0;
SUBC> pooled.

TWOSAMPLE T FOR new VS standard

<table>
<thead>
<tr>
<th>N</th>
<th>MEAN</th>
<th>STDEV</th>
<th>SE MEAN</th>
</tr>
</thead>
<tbody>
<tr>
<td>new</td>
<td>10</td>
<td>76.40</td>
<td>5.83</td>
</tr>
<tr>
<td>standard</td>
<td>12</td>
<td>72.33</td>
<td>6.34</td>
</tr>
</tbody>
</table>

95 PCT CI FOR MU new - MU standard: ( -1.4, 9.5)

TTEST MU new = MU standard (VS NE): T= 1.55 P=0.14 DF= 20

POOLED STDEV = 6.12

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2)
MTB > twos c2 c1;
SUBC> alternative 0;
SUBC> pooled.

TWOSAMPLE T FOR standard VS new

<table>
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</tr>
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<td>new</td>
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</tr>
</tbody>
</table>

95 PCT CI FOR MU standard - MU new: ( -9.5, 1.4)

TTEST MU standard = MU new (VS NE): T= -1.55 P=0.14 DF= 20

POOLED STDEV = 6.12

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3)
MTB > twos c1 c2;
SUBC> alternative -1;
SUBC> pooled.

TWOSAMPLE T FOR new VS standard

<table>
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</tbody>
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95 PCT CI FOR MU new - MU standard: ( -1.4, 9.5)

TTEST MU new = MU standard (VS LT): T= 1.55 P=0.93 DF= 20

POOLED STDEV = 6.12

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Which one of these TWOS commands should be used with our research hypothesis?