Computing the standard deviation.

It's a good idea to understand how to compute the standard deviation by hand, even though it is a waste of time to do it by hand (especially for a dataset with more than a few values.)

Moreover, you should be sure that whatever method you're using to compute it -- calculator or computer -- is giving you the correct value. So try it with these five values and be sure that it gives the same answer.

HAND:

<table>
<thead>
<tr>
<th>$x_i$</th>
<th>$(x_i - \bar{x})$</th>
<th>$(x_i - \bar{x})^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>4 - 7 = -3</td>
<td>9</td>
</tr>
<tr>
<td>5</td>
<td>-2</td>
<td>4</td>
</tr>
<tr>
<td>8</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>9</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>9</td>
<td>2</td>
<td>4</td>
</tr>
</tbody>
</table>

\[
\bar{x} = \frac{\sum_{i=1}^{n} x_i}{n} = \frac{35}{5} = 7 \quad \sum_{i=1}^{n} (x_i - \bar{x})^2 = 22
\]

\[
s = \sqrt{\frac{1}{n-1} \sum_{i=1}^{n} (x_i - \bar{x})^2} = \sqrt{\frac{1}{4} (22)} = 2.3452078799 \approx 2.345
\]

Minitab:
1. Open Minitab.
2. Put the data values into column 1 of the worksheet.
3. From the menu, choose **Basic Statistics > Display Descriptive Statistics**
   OR
   Issue the command **DESC C1**
4. Read the standard deviation from the output.
CALCULATOR:

Find your calculator's Instruction Manual and look up computing the standard deviation. Try that.

If you have trouble with it, read through these questions and your Manual and try to answer them. If you have trouble with any of them, see your instructor in person outside of class and bring the Instruction Manual.

* Does your calculator have a statistics mode? If so, how do you get into it?

* How do you enter one-variable data?

* After you have the data in, can you punch something and see how many data points you have entered?

* After you have the one-variable data in, what button(s) do you push to get the mean?

* What button(s) do you push to get the standard deviation? (Probably there are two -- one with \( n \) and one with \( n-1 \). For our purposes, we want the \( n-1 \).

* If your calculator has two-variable statistics, it will have different keys for the mean of \( x \) and the mean of \( y \). Also, there is probably a different statistics mode for one-variable statistics and two-variable statistics. Sometimes the mode for one-variable statistics is called the “standard deviation” mode and for two-variable statistics, the “regression” mode.

If you don't have an Instruction Manual, you might be able to find another student with the same calculator and borrow their Manual to copy. Or you might be able to download a copy of the Instruction Manual from the manufacturer's website.