Your calculator should give you \( x, y, r, s_x, \) and \( s_y \). It may also give you \( a, b, \) and \( SS_x \). If not, use their formulas.

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12.7’. You are given \( n = 6 \) pairs of values for \( x \) and \( y \).

<table>
<thead>
<tr>
<th>x</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>y</td>
<td>5.6</td>
<td>4.6</td>
<td>4.5</td>
<td>3.7</td>
<td>3.2</td>
<td>2.7</td>
</tr>
</tbody>
</table>

\[
x = 3.5 \quad s_x = 1.8708 \\
y = 4.05 \quad s_y = 1.0559 \\
n = 6 \quad r = -0.9871 \\
b = -0.5571 \quad a = 6 \\
\text{Regression line: } y = a + bx: \quad y = 6 - 0.556x
\]

\[
\begin{align*}
SS_x &= (n-1)(s_x)^2 = 17.5 \\
MSE &= (1-r^2)(n-1)(s_y)^2/(n-2) = .0357 \\
\text{Estimate the std. dev. of the residual error } \varepsilon: \quad s = .1890 \\
\text{Find the percentage of variation in } y \text{ which is determined by the least-squares line. } r^2 = 94.44 \%
\end{align*}
\]

Find the confidence interval for the average value of \( y \) if \( x = 10 \).

\[
df = n-2 = 4 \quad t_{\alpha/2} = 2.776
\]

\[
\text{SE} = \sqrt{0.0357(1 \frac{1}{6} + \frac{(10-3.5)^2}{17.5})} = .3036
\]

\[
(a+bx) \pm t_{\alpha/2} \text{SE} = (6-.5571*10) \pm (2.776)(.3036)
\]

\[
= [-.41, 1.27]
\]

\[
\text{Find the confidence interval for the measurement } y \text{ if } x = 10.
\]

\[
\text{SE} = \sqrt{0.0357(1 + \frac{1}{6} + \frac{(10-3.5)^2}{17.5})} = .3576
\]

\[
(a+bx) \pm t_{\alpha/2} \text{SE} = (6-.5571*10) \pm (2.776)(.3576)
\]

\[
= [-.56, 1.42]
\]

\[
\text{Find the confidence interval for the slope estimate } b.
\]

\[
\text{SE} = \sqrt{0.0357/17.5} = .0452
\]

\[
b \pm t_{\alpha/2} \text{SE} = -0.5571 \pm (2.776)(.0452)
\]

\[
= [-.68, -.43]
\]