Review how to calculate the correlation $r$ using your calculator. You should be able to calculate everything from $x$, $y$, $r$, $s_x$, and $s_y$. Your calculator probably also gives $a$ and $b$. If not, $b = rs_y/s_x$, $a = \bar{y} - bx$.

12.6(14). You are given $n=5$ pairs of values for $x$ and $y$.

<table>
<thead>
<tr>
<th>$x$</th>
<th>-2</th>
<th>-1</th>
<th>0</th>
<th>1</th>
<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td>$y$</td>
<td>1</td>
<td>1</td>
<td>3</td>
<td>5</td>
<td>5</td>
</tr>
</tbody>
</table>

$\bar{x} =$ __  $\bar{y} =$ __

$s_y =$ __  $r =$ _ _ _ 14

$b =$ _ _ _ 3  $a =$ __

Regression line: $y = a + bx$: ________________

$F =$ _ _ _ 9  $df_1 =$  $df_2 =$

Acceptance region: ________________

Is there a significant linear relation between $x$ and $y$?

Why?

Estimate the std. dev. $s$ of the residual error $\epsilon$:

$SS_y =$ _ _ _ 7

$MSE =$ _ _ _ 8

$s =$ _ _ _ 10

12.10'(14). A study was conducted to determine the effects of sleep deprivation on problem solving ability. Ten subjects participated in the study. Five levels of sleep deprivation were tested: 8, 12, 16, 20, and 24 hours without sleep. Two subjects were assigned to each level of sleep deprivation. After the sleep deprivation period each subject was given a set of addition problems and the number of errors recorded. Here are the results.

<table>
<thead>
<tr>
<th># Errors</th>
<th>8, 6</th>
<th>6, 10</th>
<th>8, 14</th>
<th>14, 12</th>
<th>16, 12</th>
</tr>
</thead>
<tbody>
<tr>
<td># Hours</td>
<td>8</td>
<td>12</td>
<td>16</td>
<td>20</td>
<td>24</td>
</tr>
</tbody>
</table>

Clearly the hours $x$ is the independent variable and the number of errors $y$ is the dependent variable. The $n = 10$ pairs of observations are:

{(8,8), (8,6), (12,6), (12,10), (16,8), (16,14), (20,14), (20,12), (24,16), (24,12)}.

$x =$ _ _ _ 7  $\bar{y} =$ _ _ _ _ 7

$s_y =$ _ _ _ _ 11  $r =$ _ _ _ 8

$b =$ _ _ _ 12  $a =$ _

Regression line: $y = a + bx$: ________________

Write $b$ to 3 decimal places.

$F =$ _ _ _ _ _ _ 15  $df_1 =$  $df_2 =$

Acceptance region: ________________

Is there a significant linear relation between the number of errors made and the number of hours without sleep?

Estimate the std. dev. $s$ of the residual error $\epsilon$:

$SS_y =$ _ _ _ _ _ _ _ _ _ _ 8

$MSE =$ _ _ _ _ _ _ _ _ _ _ 8

$s =$ _ _ _ _ _ _ _ _ _ _ 8