Note: Problems 1, 2, and 3 involve only arithmetic. They are examples of the remarkable fact that there are infinitely many right triangles with integer-length sides that are not just multiples of each other (like 3-4-5 and 6-8-10). Problem 4 (optional) is to show why. A strong Algebra student can do it.

Second given row:
In the first column put 2.
Double it (to get 4) and add 1 (to get 5). Put the result in column a.
Square that (to get 25), subtract 1 (to get 24) and divide by 2 (to get 12).
Put that in column b.
Finally, add 1 (to get 13) and put the result in c.

Another row:
In the first column put 5.
Double it (to get 10) and add 1 (to get 11). Put the result in column a.
Square that (to get 121), subtract 1 (to get 120) and divide by 2 (to get 60).
Put that in column b.
Finally, add 1 (to get 61) and put the result in c.

<table>
<thead>
<tr>
<th>#</th>
<th>a</th>
<th>b</th>
<th>c</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>2</td>
<td>5</td>
<td>12</td>
<td>13</td>
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<td>3</td>
<td>7</td>
<td>24</td>
<td>25</td>
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<td>5</td>
<td>11</td>
<td>60</td>
<td>61</td>
</tr>
<tr>
<td>10</td>
<td>21</td>
<td>220</td>
<td>221</td>
</tr>
</tbody>
</table>

Another example of checking that \( a^2 + b^2 = c^2 \):
For the row that begins with 3, the squares are \( 7^2 = 49 \), \( 24^2 = 576 \) and \( 25^2 = 625 \).
Adding, we get \( 49 + 576 = 625 \).

Yet another example of checking that \( a^2 + b^2 = c^2 \):
\( 21^2 + 220^2 = 441 + 48400 = 48841 \) which matches up with \( 221^2 = 48841 \)

3 Easy Favors
If your brilliant student figured out why this always works (#4), please send me that student's name by email and encourage the student to come to MathLab for a prize.
Please send any great math student to MathLab for SAT and enrichment.
Please send any struggling math student to MathLab for timely rescue.