College Bound Math Solutions #14
week of February 2, 2015

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**.

#	a	b	c
1	3	4	5
2	5	12	13
3	7	24	25
5	11	60	61
10	21	220	221

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.