Table 2c

Tertiary Tree of Primitive Pythagorean Triples

Trunk								A ÷ 7	1st Tertiary Branch								A ÷ 7	2nd Tertiary Branches								A ÷ 7	3rd Tertiary Branches								A ÷ 7
PPT	*r*	*s*	*t*	A	4A	8A	*f*		PPT	*r*	*s*	*t*	A	4A	8A	*f*		PPT	*r*	*s*	*t*	A	4A	8A	*f*		PPT	*r*	*s*	*t*	A	4A	8A	*f*	
3-4-5	2	1	2	6	24	48	**1**		**5-12-13**	4	1	8	30	120	240	**7**		**119-120-169**	70	49	50	7140	28560	57120	**1**	✓	217-456-505	168	49	288	49,476	197,904	395,808	239	✓
									20-21-29	12	8	9	210	840	1680	**1**	✓											**696-697-985**	408	288	289	242556	970224	1940448	**1**	
									8-15-17	6	2	9	60	240	480	**7**												220-459-509	170	50	289	50,490	201,904	403,920	239	

Making the“red”-MIDDLE Branch

The sum, ∑, of **3-4-5** = 12 and becomes the *r*-value of **MIDDLE RED**
The sum, ∑, of **20-21-29** = 70 and becomes the *r*-value of **MIDDLE RED**
The sum, ∑, of **119-120-169** = 408 and becomes the *r*-value of **MIDDLE RED**

The larger *s* or *t* of the **BLUE** becomes the *s,t* values of the **MIDDLE RED**:

for the **5-12-13 PPT**, the larger *t*=8 becomes the *s*-value of **MIDDLE RED**,
for the **8-15-17 PPT**, the larger *t*=9 becomes the *t*-value of MIDDLE RED.

The **MIDDLE RED 20-21-29 PPT** has $r = 12$, $s = 8$ and $t = 9$ values, so
$a = r+s = 12+8 = 20$ $b = r + t = 12+9 = 21$ $c = r+s+t = 12+8+9 = 29$
giving the **MIDDLE RED 20-21-29 PPT Branch**.

The *f*-value as $f = b - a = 21 - 20 = 1$

Table 2c

Key: PPT=Primitive Pythagorean Triple; *r*=even # such that $r^2/2=st$ where *s,t* are Factor Pairs; A=Area; 4A=4Area; 8A=8Area; $f=b-a$ & $f^2=(b-a)^2$, as $a^2 + b^2 = c^2 = 4A + f^2 = (8A + f^2) - 4A$

The Tree of Pythagorean Triples branches from the **3-4-5 PPT** trunk first into a 3-part main branch, each of which further branches into 2nd, 3rd, 4th, …, tertiary branches. Each tertiary follows the lead *f*-value of its predecessor, but is actually formed as an intermediary to the upper and lower branches of which it is a part. All **PPT**s — with no repeats — are to be found. ***Pythagoras*** first discovered the UPPER branch sequence, ***Plato*** (a century later) discovered the LOWER branch sequence. The MIDDLE branch sequence follows as an intermediary, hybrid sequence of the UPPER and LOWER.

Using the *Expanded Dickson Method* on the **BBS-ISL Matrix**, every **PPT** branch is accounted for by the previous branch. This is done by enlisting the *r,s,t*,A,4A,8A,*f* associated values. All these values are derived directly from the respective **PTT** by both algebra and geometry. In **Table 2a** we looked at the overall. In **Table 2b**, we examine how the UPPER and LOWER branches (blue) are made from the trunk (red). In **Table 2c**, we see how the MIDDLE branch (red) is formed from the UPPER and LOWER (blue) branches and the trunk (red). As a fractal, this ***Number Pattern Sequence*** that defines the first branchings, continues through the entire tree. **Table 2d** shows BLUE branching to **2nd Tertiary Branches**. **Table 2e** reveals the power of *f*. **Table 2f** tells all.