Title: Sum of simple composite numbers by Golden Patterns
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Abstract: This paper develops the formula that calculates the sum of simple composite numbers by golden patterns.

Keywords: Golden Pattern, rough number, prime number, simple composite number.

Golden patterns

All the golden patterns have the same characteristics, (harmony, equilibrium, balance, etc) for which I have discovered a formula to calculate the sum of simple composite numbers by Golden patterns.

Sum of simple composite numbers by Golden Patterns

$$\sum \boldsymbol{Nc} = \frac{\boldsymbol{Pt^2 + Pt - Pt * Nps}}{\boldsymbol{2}}$$

Nc = Simple composite number
Pt= Size of the Golden Pattern http://vixra.org/abs/1803.0121
Nps= Quantity of simple prime number by Golden Pattern http://vixra.org/abs/1803.0178

A) **Example** 3-Golden Pattern http://vixra.org/abs/1803.0098

$$\sum_{1}^{18} \boldsymbol{Nc} = \boldsymbol{2+3+4+6+8+9+10+12+14+15+16+18=117}$$

Applying the formula

$$\sum_{1}^{18} \boldsymbol{Nc} = \frac{\boldsymbol{18^2+18-18*6}}{\boldsymbol{2}} = \boldsymbol{117}$$

B) **Example** 5-Golden Pattern

$$\sum_{1}^{90} \boldsymbol{Nc} = \frac{\boldsymbol{90^2+90-90*24}}{\boldsymbol{2}} = \boldsymbol{3.015}$$

C) **Example** 7-Golden Pattern

$$\sum_{1}^{630} Nc = \frac{630^2 + 630 - 630 * 144}{2} = 153.405$$

D) **Example** 11-Golden Pattern

$$\sum_{1}^{6.930} Nc = \frac{6.930^2 + 6.930 - 6.930 * 1.440}{2} = 19.026.315$$

E) **Example** 13-Golden Pattern

$$\sum_{1}^{90.090} Nc = \frac{90.090^2 + 90.090 - 90.090 * 17.280}{2} = 3.279.771.495$$

We can continue adding examples with the following Golden patterns.

	Size of Golden Patterns	$\sum Nc$
3-Golden Pattern	**18**	**117**
5-Golden Pattern	**90**	**3.015**
7-Golden Pattern	**630**	**153.405**
11-Golden Pattern	**6.930**	**19.026.315**
13-Golden Pattern	**90.090**	**3.279.771.495**

Table 1

Sum of simple composite numbers by Golden Pattern and the next patterns

$$\boldsymbol{Patterns\ n} \sum \boldsymbol{Nc} = \left(\frac{\boldsymbol{Pt^2 + Pt - Pt * Nps}}{\boldsymbol{2}}\right) * \boldsymbol{Nex} - \boldsymbol{Pt} * (\boldsymbol{n} - \boldsymbol{1}) =$$

$\boldsymbol{Nc}$ = Simple composite number
$\boldsymbol{Pt}$ = Size of the Golden Pattern
$\boldsymbol{Nps}$ = Quantity of simple prime number by Golden Pattern

$\boldsymbol{Nex}$ =**Next Pattern** (Golden Pattern =**1**, Pattern2 =**3**, Pattern3 =**5**, Pattern4 =**7**, Pattern6 = **9** ....) Each pattern is always linked with odd numbers.
$\boldsymbol{n}$ = **Pattern Number** (Golden Pattern 1 =1, Pattern 2 =2, Pattern 3 =3, Pattern 4 =4, ...)

A) **Example** 3-Golden Pattern

$$\boldsymbol{Golden\ Pattern\ 1} \sum_{1}^{18} \mathrm{Nc} = \left(\frac{\boldsymbol{18^2 + 18 - 18 * 6}}{\boldsymbol{2}}\right) * \boldsymbol{1} - \boldsymbol{18} * (\boldsymbol{1} - \boldsymbol{1}) = \boldsymbol{117}$$

$$\boldsymbol{Pattern\ 2} \sum_{19}^{36} \mathrm{Nc} = \left(\frac{\boldsymbol{18^2 + 18 - 18 * 6}}{\boldsymbol{2}}\right) * \boldsymbol{3} - \boldsymbol{18} * (\boldsymbol{2} - \boldsymbol{1}) = \boldsymbol{333}$$

$$\boldsymbol{Pattern\ 3} \sum_{37}^{54} \mathrm{Nc} = \left(\frac{\boldsymbol{18^2 + 18 - 18 * 6}}{\boldsymbol{2}}\right) * \boldsymbol{5} - \boldsymbol{18} * (\boldsymbol{3} - \boldsymbol{1}) = \boldsymbol{549}$$

$$\boldsymbol{Pattern\ 4} \sum_{55}^{72} \mathrm{Nc} = \left(\frac{\boldsymbol{18^2 + 18 - 18 * 6}}{\boldsymbol{2}}\right) * \boldsymbol{7} - \boldsymbol{18} * (\boldsymbol{4} - \boldsymbol{1}) = \boldsymbol{765}$$

The sum of composite numbers generates a difference between patterns of 216.

Formula to calculate the difference

$$Diff = 2 * (Golden\ Pattern\ 1 \sum_{1}^{18} \mathrm{Nc}) - Pt$$

$$Diff = 2 * 117 - 18 = \boldsymbol{216}$$

B) **Example** 5-Golden Pattern

$$\boldsymbol{Golden\ Pattern\ 1} \sum_{1}^{90} \mathrm{Nc} = \left(\frac{\boldsymbol{90^2 + 90 - 90 * 24}}{\boldsymbol{2}}\right) * \boldsymbol{1} - \boldsymbol{90} * (\boldsymbol{1} - \boldsymbol{1}) = \boldsymbol{3.015}$$

$$\boldsymbol{Pattern\ 2} \sum_{91}^{180} \mathrm{Nc} = \left(\frac{\boldsymbol{90^2 + 90 - 90 * 24}}{\boldsymbol{2}}\right) * \boldsymbol{3} - \boldsymbol{90} * (\boldsymbol{2} - \boldsymbol{1}) = \boldsymbol{8.955}$$

$$\boldsymbol{Pattern\ 3} \sum_{181}^{270} \text{Nc} = \left(\frac{\mathbf{90^2 + 90 - 90 * 24}}{\mathbf{2}}\right) * \mathbf{5} - \mathbf{90} * (\mathbf{3} - \mathbf{1}) = \mathbf{14.895}$$

$$\boldsymbol{Pattern\ 4} \sum_{271}^{360} \text{Nc} = \left(\frac{\mathbf{90^2 + 90 - 90 * 24}}{\mathbf{2}}\right) * \mathbf{7} - \mathbf{90} * (\mathbf{4} - \mathbf{1}) = \mathbf{20.835}$$

The sum of composite numbers generates a difference between patterns of 5.940

<u>Formula to calculate the difference</u>

$$Diff = \ 2 * (Golden\ Pattern\ 1 \sum_{1}^{90} \text{Nc})\ - Pt$$

$$Diff = 2 * 3.015 - 90 = \ \mathbf{5.940}$$

C) **<u>Example</u>** <u>7-Golden Pattern</u>

$$\boldsymbol{Golden\ Pattern\ 1} \sum_{1}^{630} \text{Nc} = \left(\frac{\mathbf{630^2 + 630 - 630 * 144}}{\mathbf{2}}\right) * \mathbf{1} - \mathbf{630} * (\mathbf{1} - \mathbf{1}) = \mathbf{153.405}$$

$$\boldsymbol{Pattern\ 2} \sum_{631}^{1260} \text{Nc} = \left(\frac{\mathbf{630^2 + 630 - 630 * 144}}{\mathbf{2}}\right) * \mathbf{3} - \mathbf{630} * (\mathbf{2} - \mathbf{1}) = \mathbf{459.585}$$

$$\boldsymbol{Pattern\ 3} \sum_{1261}^{1890} \text{Nc} = \left(\frac{\mathbf{630^2 + 630 - 630 * 144}}{\mathbf{2}}\right) * \mathbf{5} - \mathbf{630} * (\mathbf{3} - \mathbf{1}) = \mathbf{765.765}$$

$$\boldsymbol{Pattern\ 4} \sum_{1891}^{2520} \text{Nc} = \left(\frac{\mathbf{630^2 + 630 - 630 * 144}}{\mathbf{2}}\right) * \mathbf{7} - \mathbf{630} * (\mathbf{4} - \mathbf{1}) = \mathbf{1.071.945}$$

The sum of composite numbers generates a difference between patterns of 306.180

<u>Formula to calculate the difference</u>

$$Diff = 2 * (Golden\ Pattern\ 1 \sum_{1}^{630} \text{Nc})\ - Pt$$

$$Diff = 2 * 153.405 - 630 = \ \mathbf{306.180}$$

Final conclusion

The formula is a simple method that helps us to decipher the sum of the simple composite numbers that exist by pattern. All Golden Patterns are closely linked, and this formula manages to connect absolutely to all of them.

This Paper is extracted from my book The Golden Pattern II
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