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     IT FORMULATES FOR I NUMBER PI
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  THEOREM

 infinity      (-1)^(n+1)
   SUM [ ------------------------- ] =
   n=1       (n + 1) * (2*n + 1)

- PI/2 + LN(2) + 1

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                DEMONSTRATION
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If we take the well-known formula for the number pi

```
 infinity       (-1)^(n+1)
   SUM [ ----------------------------- ] =  PI - 3
   n=1        n * (n + 1)*(2*n + 1)
```

Preserving denominators is possible to build a
New formula

```
 1/n - 1/(2*n+1) = (n+1)/(n * (2*n+1))

 1/(n+1) - 1/(2*n+1) = n/((n+1) * (2*n+1))

 (n+1)/(n * (2*n+1)) + n/((n+1) * (2*n+1)) =

 ((n+1)^2 + n^2)/(n * (n+1) * (2*n+1)) =

 (2*n^2 + 2*n + 1)/(n * (n+1) * (2*n+1))

 infinity                     2*n^2 + 2*n + 1
   SUM [ (-1)^(n+1) * --------------------------- ]
   n=1                      n * (n + 1)*(2*n + 1)
```

This formula is equal to the succes numbers

```
 +(1/1 - 1/3) +(1/2 - 1/3)

 -(1/2 - 1/5) -(1/3 - 1/5)

 +(1/3 - 1/7) +(1/4 - 1/7)

 -(1/4) -1/9) -(1/5) -1/9)
```

Fractions that occupy the new posts 2*n and 4*n is equal to

```
- 2/3 + 2/5 - 2/7 + 2/9 - 2/11 + 2/13 - 2/15 + 2/17 -...
```

Which equals to PI/2 - 2

The remaining fractions cancel each other except first fracciom 1/1

Therefore the formula

$$\sum_{n=1}^{\infty} \left[(-1)^{(n+1)} * \frac{2*n^2 + 2*n + 1}{n * (n + 1)*(2*n + 1)} \right]$$

Equals to PI/2 - 1

If we divide this formula into two adding

$$\sum_{n=1}^{\infty} \left[(-1)^{(n+1)} * \left(\frac{2*n^2 + 2*n}{n * (n + 1)*(2*n + 1)} + \frac{1}{n * (n + 1)*(2*n + 1)} \right) \right]$$

The sum of the terms of adding the second is equal to the known formula for the Number Pi

$$\sum_{n=1}^{\infty} \left[\frac{(-1)^{(n+1)}}{n * (n + 1)*(2*n + 1)} \right] = PI - 3$$

Therefore the sum of the terms of adding first

$$\sum_{n=1}^{\infty} \left[(-1)^{(n+1)} * \frac{2*n^2 + 2*n}{n * (n + 1)*(2*n + 1)} \right]$$

Is equal to the total result less (PI - 3)

$$(PI/2 - 1) - (PI - 3) = - PI/2 + 2$$

This formula can be divided into two adding

$$\sum_{n=1}^{\infty} \left[(-1)^{(n+1)} * \left(\frac{2*n^2}{n * (n + 1)*(2*n + 1)} + \frac{2*n}{n * (n + 1)*(2*n + 1)} \right) \right]$$

The first adding can be written as

$$\sum_{n=1}^{\infty} \left[(-1)^{(n+1)} * \frac{2*n}{(n + 1) * (2*n + 1)} \right]$$

And dividing by two

$$\sum_{n=1}^{\infty} \left[(-1)^{(n+1)} * \frac{n}{(n + 1) * (2*n + 1)} \right]$$

If we develop in fractions obtained

1/(n+1) - 1/(2*n+1) = n/((n+1) * (2*n+1))

Therefore adding this is equal to the succes numbers

+(1/2 - 1/3)

-(1/3 - 1/5)

+(1/4 - 1/7)

-(1/5 - 1/9)

+(1/6 - 1/11)

Fractions that occupy positions pairs equals

- 1/3 + 1/5 - 1/7 + 1/9 - 1/11 + 1/15 - 1/17 + 1/19 -...

Which equals to PI/4 - 1

Fractions that are odd is equal to

+ 1/2 - 1/3 + 1/4 - 1/5 + 1/6 - 1/7 + 1/8 -...

Which equals - logarithm (2) + 1

Hence the first adding equals

PI/4 - LN(2)

As we have divided by two equals

PI/2 - 2*LN(2)

Therefore the sum of the terms of the second adding

$$\sum_{n=1}^{\infty} \left[(-1)^{(n+1)} * \frac{2*n}{n * (n + 1)*(2*n + 1)} \right]$$

Is equal to the total result less (PI/2 - 2*LN(2))

$$(- PI/2 + 2) - (PI/2 - 2*LN(2)) = - PI + 2*LN(2) + 2$$

Can be written as

$$\sum_{n=1}^{\infty} \left[(-1)^{(n+1)} * \frac{2}{(n + 1)*(2*n + 1)} \right]$$

And finally if we divide by two you get the final result

$$\sum_{n=1}^{\infty} \left[\frac{(-1)^{(n+1)}}{(n + 1) * (2*n + 1)} \right] =$$

$$- PI/2 + LN(2) + 1$$