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FORMULA FOR THE NUMBER PI

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THEOREM

$$\sum_{n=1}^{\infty} \left[\frac{1}{(4*n-3)*(4*n)} \right] = PI/24 + LN(2)/4$$

DEMONSTRATION

First take the formula that was equal to Logarithm(2)

$$\sum_{n=1}^{\infty} \left[\frac{2*(4*n-1)*(4*n-2) + 2}{(4*n-3)*(4*n-2)*(4*n-1)*(4*n)} \right] = LN(2)$$

This formula can be shown as follows
Each term of the formula can be divided into two parts

Part I

$$+ (1/(4*n-3) - 1/(4*n-2)) + (1/(4*n-2) - 1/(4*n-1))$$

This in turn two adding up
The first is equal to adding

$$1/((4*n-3)*(4*n-2))$$

The second is equal to adding

$$1/((4*n-2)*(4*n-1))$$

If the two join totaling

$$1/((4*n-3)*(4*n-2)) + 1/((4*n-2)*(4*n-1)) =$$

$$((4*n-1) + (4*n-3))/((4*n-3)*(4*n-2)*(4*n-1)) =$$

$$(8*n-4)/((4*n-3)*(4*n-2)*(4*n-1))$$

Part Two

+ (1/(4*n-1) - 1/(4*n-2)) + (1/(4*n-1) - 1/(4*n))

The first is equal to adding

- 1/((4*n-1)*(4*n-2))

The second is equal to adding

+ 1/((4*n-1)*(4*n))

If the two join totaling

- 1/((4*n-1)*(4*n-2)) + 1/((4*n-1)*(4*n)) =

(- (4*n) + (4*n-2))/((4*n-1)*(4*n-2)*(4*n)) =

- 2/((4*n-1)*(4*n-2)*(4*n))

And finally, if the two sides join in which divide
Each term

(8*n-4)/((4*n-3)*(4*n-2)*(4*n-1)) - 2/((4*n-2)*(4*n-1)*(4*n)) =

((4*n)*(8*n-4)- 2*(4*n-3))/((4*n-3)*(4*n-2)*(4*n-1)*(4*n))

Numerator can be written as

(4*n)*(8*n-4) - (8*n-6) =

(4*n)*(8*n-4) - ((8*n-4) - 2) =

(4*n-1)*(8*n-4) + 2 =

2*(4*n-1)*(4*n-2) + 2

You get the formula final

```
 infinity         2*(4*n-1)*(4*n-2) + 2
   SUM [ ----------------------------------------- ]
   n=1       (4*n-3)*(4*n-2)*(4*n-1)*(4*n)
```

Therefore this formula is equal to the succes numbers

+ (1/1 - 1/2) + (1/3 - 1/4)

+ (1/5 - 1/6) + (1/7 - 1/8)

+ (1/9 - 1/10) + (1/11 - 1/12)

Which equals LN(2)

If we divide it into two adding up

$$\sum_{n=1}^{\infty} \left[\frac{2(4n-1)(4n-2)}{(4n-3)(4n-2)(4n-1)(4n)} + \frac{2}{(4n-3)(4n-2)(4n-1)(4n)} \right] = \ln(2)$$

The sum of the terms of the second adding

$$\sum_{n=1}^{\infty} \left[\frac{2}{(4n-3)(4n-2)(4n-1)(4n)} \right]$$

Is equal to the formula E. H. Clarke

$$\sum_{n=1}^{\infty} \left[\frac{1}{(4n-3)(4n-2)(4n-1)(4n)} \right] =$$

$$- \pi/24 + \ln(2)/4$$

Multiplied by two

$$- \pi/12 + \ln(2)/2$$

Thus the sum of the terms of adding first

$$\sum_{n=1}^{\infty} \left[\frac{2(4n-1)(4n-2)}{(4n-3)(4n-2)(4n-1)(4n)} \right]$$

Is equal to the total result unless the formula E. H. Clarke
Multiplied by 2

$$\ln(2) - (- \pi/12 + \ln(2)/2) = \pi/12 + \ln(2)/2$$

$$\sum_{n=1}^{\infty} \left[\frac{2(4n-1)(4n-2)}{(4n-3)(4n-2)(4n-1)(4n)} \right] = \pi/12 + \ln(2)/2$$

Can be written as

```
 infinity            2
   SUM [ -------------------- ] = PI/12 + LN(2)/2
   n=1        (4*n-3)*(4*n)
```

And finally, if we divide it by two obtained the formula
End

```
 infinity             1
   SUM [ ------------------- ] = PI/24 + LN(2)/4
   n=1       (4*n-3)*(4*n)
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