1990 HI19

求 $\dfrac{1}{2\times3}+\dfrac{1}{3\times4}+\dfrac{1}{4\times5}+\cdots+\dfrac{1}{19\times20}$ 的值。

Find the value of $\dfrac{1}{2\times3}+\dfrac{1}{3\times4}+\dfrac{1}{4\times5}+\cdots+\dfrac{1}{19\times20}$.

1991 HG2

若 $\dfrac{1}{2}+\dfrac{1}{6}+\dfrac{1}{12}+\dfrac{1}{20}+\dfrac{1}{30}+\dfrac{1}{42}+\cdots+\dfrac{1}{2450}=\dfrac{x}{100}$ ，求 x 的值。

If $\dfrac{1}{2}+\dfrac{1}{6}+\dfrac{1}{12}+\dfrac{1}{20}+\dfrac{1}{30}+\dfrac{1}{42}+\cdots+\dfrac{1}{2450}=\dfrac{x}{100}$, find the value of x .

1994 HG10

已知 $\dfrac{1}{n}-\dfrac{1}{n+2}=\dfrac{2}{n(n+2)}$ 。若 $a=\dfrac{1}{1\cdot3}+\dfrac{1}{3\cdot5}+\dfrac{1}{5\cdot7}+\cdots+\dfrac{1}{111\cdot113}$ ，

求 a 的值。

Given that $\dfrac{1}{n}-\dfrac{1}{n+2}=\dfrac{2}{n(n+2)}$.

Find the value of a if $a=\dfrac{1}{1\cdot3}+\dfrac{1}{3\cdot5}+\dfrac{1}{5\cdot7}+\cdots+\dfrac{1}{n(n+2)}+\cdots+\dfrac{1}{111\cdot113}$.

1994 FG6.2

若 $b=\log_3[2(3+1)(3^2+1)(3^4+1)(3^8+1)+1]$ ，求 b 的值。

If $b=\log_3[2(3+1)(3^2+1)(3^4+1)(3^8+1)+1]$, find the value of b .

1996 HG5

已知 $\dfrac{1}{n(n+1)}=\dfrac{1}{n}-\dfrac{1}{n+1}$ ，求 $\dfrac{1}{2\times3}+\dfrac{1}{3\times4}+\cdots+\dfrac{1}{99\times100}$ 之值。

Given that $\dfrac{1}{n(n+1)}=\dfrac{1}{n}-\dfrac{1}{n+1}$, find the value of $\dfrac{1}{2\times3}+\dfrac{1}{3\times4}+\cdots+\dfrac{1}{99\times100}$.

1996 FI4.4

若 $d=\dfrac{1}{1\times2}+\dfrac{1}{2\times3}+\cdots+\dfrac{1}{9\times10}$ ，求 d 的值。

If $d=\dfrac{1}{1\times2}+\dfrac{1}{2\times3}+\cdots+\dfrac{1}{9\times10}$, find the value of d .

1996 FI5.3

設 $c=\dfrac{1}{2^2-1}+\dfrac{1}{4^2-1}+\dfrac{1}{6^2-1}+\cdots+\dfrac{1}{20^2-1}$ ，求 c 的值。

Let $c=\dfrac{1}{2^2-1}+\dfrac{1}{4^2-1}+\dfrac{1}{6^2-1}+\cdots+\dfrac{1}{20^2-1}$, find the value of c .

Hint 提示： $\dfrac{1}{x^2-1}=\dfrac{1}{2}\left(\dfrac{1}{x-1}-\dfrac{1}{x+1}\right)$

2000 HI2

解下列方程：

$$\dfrac{1}{x+12}+\dfrac{1}{(x+1)(x+2)}+\dfrac{1}{(x+2)(x+3)}+\dfrac{1}{(x+3)(x+4)}+\cdots+\dfrac{1}{(x+10)(x+11)}+\dfrac{1}{(x+11)(x+12)}=\dfrac{1}{4}$$

Solve the following equation:

$$\dfrac{1}{x+12}+\dfrac{1}{(x+1)(x+2)}+\dfrac{1}{(x+2)(x+3)}+\dfrac{1}{(x+3)(x+4)}+\cdots+\dfrac{1}{(x+10)(x+11)}+\dfrac{1}{(x+11)(x+12)}=\dfrac{1}{4}$$

2001 HG4

如果 $\dfrac{4a}{1-x^{16}}\equiv\dfrac{2}{1-x}+\dfrac{2}{1+x}+\dfrac{4}{1+x^2}+\dfrac{8}{1+x^4}+\dfrac{16}{1+x^8}$ ，求 a 的值。

If $\dfrac{4a}{1-x^{16}}\equiv\dfrac{2}{1-x}+\dfrac{2}{1+x}+\dfrac{4}{1+x^2}+\dfrac{8}{1+x^4}+\dfrac{16}{1+x^8}$, find the value of a .

2001 FG1.2

已知 $b\left[\dfrac{1}{1\times3}+\dfrac{1}{3\times5}+\cdots+\dfrac{1}{1999\times2001}\right]=2\times\left[\dfrac{1^2}{1\times3}+\dfrac{2^2}{3\times5}+\cdots+\dfrac{1000^2}{1999\times2001}\right]$ ，

求 b 的值。

Given that $b\left[\dfrac{1}{1\times3}+\dfrac{1}{3\times5}+\cdots+\dfrac{1}{1999\times2001}\right]=2\times\left[\dfrac{1^2}{1\times3}+\dfrac{2^2}{3\times5}+\cdots+\dfrac{1000^2}{1999\times2001}\right]$,

find the value of b .

2002 FI2.1

已知 $P=\dfrac{1}{1\times2}+\dfrac{1}{2\times3}+\dfrac{1}{3\times4}+\cdots+\dfrac{1}{99\times100}$ ，求 P 的值。

Given that $P=\dfrac{1}{1\times2}+\dfrac{1}{2\times3}+\dfrac{1}{3\times4}+\cdots+\dfrac{1}{99\times100}$, find the value of P .

2003 HG1

若 $k = \dfrac{1}{4 \times 5 \times 6} + \dfrac{1}{5 \times 6 \times 7} + \dfrac{1}{6 \times 7 \times 8} + \cdots + \dfrac{1}{99 \times 100 \times 101}$ ，求 k 的值。

If $k = \dfrac{1}{4 \times 5 \times 6} + \dfrac{1}{5 \times 6 \times 7} + \dfrac{1}{6 \times 7 \times 8} + \cdots + \dfrac{1}{99 \times 100 \times 101}$, find the value of k.

2005 HI6

設 n 是自然數，直線 $nx + (n + 1)y = \sqrt{2}$ 與兩坐標軸所圍成的三角形的面積是 S_n。若 $K = S_1 + S_2 + \cdots + S_{2005}$，求 K 的值。

Let n be a natural number, the area of the triangle bounded by the line $nx + (n + 1)y = \sqrt{2}$ and the two ordinate axes is S_n.

If $K = S_1 + S_2 + \cdots + S_{2005}$, find the value of K.

2005 FI3.4

若 $c = \dfrac{1}{2}$ ，$\dfrac{1}{(c+1)(c+2)} + \dfrac{1}{(c+2)(c+3)} + \cdots + \dfrac{1}{(c+d)(c+d+1)} = \dfrac{8}{15}$ ，求 d 的值。

If $c = \dfrac{1}{2}$ and $\dfrac{1}{(c+1)(c+2)} + \dfrac{1}{(c+2)(c+3)} + \cdots + \dfrac{1}{(c+d)(c+d+1)} = \dfrac{8}{15}$,

find the value of d.

2009 HG1

若 a 是正整數及 $\dfrac{1}{a(a+1)} + \dfrac{1}{(a+1)(a+2)} + \cdots + \dfrac{1}{2008 \times 2009} = \dfrac{272}{30135}$ ，

求 a 的值。

If a is a positive integer and $\dfrac{1}{a(a+1)} + \dfrac{1}{(a+1)(a+2)} + \cdots + \dfrac{1}{2008 \times 2009} = \dfrac{272}{30135}$,

find the value of a.

2010 HI3

若 $a = \dfrac{1}{5 \times 10} + \dfrac{1}{10 \times 15} + \dfrac{1}{15 \times 20} + \cdots + \dfrac{1}{100 \times 105}$ ，求 a 的值。

If $a = \dfrac{1}{5 \times 10} + \dfrac{1}{10 \times 15} + \dfrac{1}{15 \times 20} + \cdots + \dfrac{1}{100 \times 105}$, find the value of a.

2011 FI2.4

若 $S > 0$ 及 $\dfrac{1}{S(S-1)} + \dfrac{1}{(S+1)S} + \cdots + \dfrac{1}{(S+20)(S+19)} = \dfrac{5}{6}$ ，求 S 的值。

If $S > 0$ and $\dfrac{1}{S(S-1)} + \dfrac{1}{(S+1)S} + \cdots + \dfrac{1}{(S+20)(S+19)} = \dfrac{5}{6}$, find the value of S.

2012 FI4.1

若 A 為一正整數且 $\dfrac{1}{1 \times 3} + \dfrac{1}{3 \times 5} + \cdots + \dfrac{1}{(A+1)(A+3)} = \dfrac{12}{25}$ ，求 A 的值。

If A is a positive integer such that $\dfrac{1}{1 \times 3} + \dfrac{1}{3 \times 5} + \cdots + \dfrac{1}{(A+1)(A+3)} = \dfrac{12}{25}$,

find the value of A.

2014 FG3.2

若 $\dfrac{\beta}{1 \times 2 \times 3} + \dfrac{\beta}{2 \times 3 \times 4} + \cdots + \dfrac{\beta}{8 \times 9 \times 10} = 11$ ，求 β 的值。

Determine the value of β if $\dfrac{\beta}{1 \times 2 \times 3} + \dfrac{\beta}{2 \times 3 \times 4} + \cdots + \dfrac{\beta}{8 \times 9 \times 10} = 11$.

2015 HI8

求 $\dfrac{1}{4029} + \dfrac{2 \times 2014}{2014^2 + 2015^2} + \dfrac{4 \times 2014^3}{2014^4 + 2015^4} - \dfrac{8 \times 2014^7}{2014^8 - 2015^8}$ 的值。

Find the value of $\dfrac{1}{4029} + \dfrac{2 \times 2014}{2014^2 + 2015^2} + \dfrac{4 \times 2014^3}{2014^4 + 2015^4} - \dfrac{8 \times 2014^7}{2014^8 - 2015^8}$.

2015 HG1

求 $\dfrac{1}{1860 \times 1865} + \dfrac{1}{1865 \times 1870} + \dfrac{1}{1870 \times 1875} + \cdots + \dfrac{1}{2010 \times 2015}$ 的值。

Find the value of $\dfrac{1}{1860 \times 1865} + \dfrac{1}{1865 \times 1870} + \dfrac{1}{1870 \times 1875} + \cdots + \dfrac{1}{2010 \times 2015}$.

2015 HG10

設 a_n 及 b_n 為二次函數 $y = n(n - 1)x^2 - (2n - 1)x + 1$ 的截距，其中 n 為一個大於 1 的整數。求 $a_2b_2 + a_3b_3 + \ldots + a_{2015}b_{2015}$ 的值。

Let a_n and b_n be the x-intercepts of the quadratic function
$y = n(n - 1)x^2 - (2n - 1)x + 1$, where n is an integer greater than 1.
Find the value of $a_2b_2 + a_3b_3 + \ldots + a_{2015}b_{2015}$.

2016 FG1.4

求 $T = \left(3^{2^0} + 1\right) \times \left(3^{2^1} + 1\right) \times \left(3^{2^2} + 1\right) \times \cdots \times \left(3^{2^{10}} + 1\right)$ 的值。（答案以指數表示。）

Determine the value of $T = \left(3^{2^0} + 1\right) \times \left(3^{2^1} + 1\right) \times \left(3^{2^2} + 1\right) \times \cdots \times \left(3^{2^{10}} + 1\right)$.
(Leave your answer in index form.)

Answers

1990 HI19 $\dfrac{9}{20}$	1991 HG2 98	1994 HG10 $\dfrac{56}{113}$	1994 FG6.2 16	1996 HG5 $\dfrac{49}{100}$
1996 FI4.4 $\dfrac{9}{10}$	1996 FI5.3 $\dfrac{10}{21}$	2000 HI2 3	2001 HG4 8	2001 FG1.2 1001
2002 FI2.1 $\dfrac{99}{100}$	2003 HG1 $\dfrac{63}{2525}$	2005 HI6 $\dfrac{2005}{2006}$	2005 FI3.4 6	2009 HG1 105
2010 HI3 $\dfrac{4}{105}$	2011 FI2.4 $\dfrac{-95+3\sqrt{1505}}{10}$	2012 FI4.1 22	2014 FG3.2 45	2015 HI8 1
2015 HG1 $\dfrac{1}{120900}$	2015 HG10 $\dfrac{2014}{2015}$	2016 FG1.4 $\dfrac{1}{2}\left(3^{2048}-1\right)$		