CHUYÊN ĐỀ.THỰC HIỆN DÃY TÍNH – TÍNH NHANH

A/ KIẾN THỨC CẦN NHỚ

Với bài toán thực hiện phép tính trong các kì thi học sinh giỏi, đòi hỏi học sinh phải nhanh nhạy trong việc phối hợp nhiều phép tinh như: phép tính lũy thừa, phép tính cộng trừ các phân số, tối giản phân số, rồi tính tổng theo quy luật…thứ tự thực hiện phép tính

KIẾN THỨC BỔ TRỢ:

1/ Công thức tính lũy thừa của số tự nhiên:

$a^m.a^n = a^{m+n}$ $(a.b)^m = a^m.b^m$ $(a^m)^n = a^{m.n}$

$\left(\frac{a}{b}\right)^m = \frac{a^m}{b^n} \quad (b \neq 0)$ hay $(a : b)^m = a^m : b^m$

2/ Một số công thức đặt thừa số chung

$a.b + a.c + a.d + \ldots.. + a.\ k = a.(b + c + d + \ldots + k)$

$$\frac{a}{x_1} + \frac{a}{x_2} + \ldots + \frac{a}{x_n} = a.\left(\frac{1}{x_1} + \frac{1}{x_2} + \ldots + \frac{1}{x_n}\right)$$

4/ Một số công thức tính tổng.

a) Tổng các số hạng cách đều: $S = a_1 + a_2 + a_3 + \ldots. + a_n$ **(1)**

Với $a_2 - a_1 = a_3 - a_2 = \ldots = a_n - a_{n-1} = d$ (các số hạng cách đều)

Số số hạng trong tổng là **n** = $(a_n - a_1) : d + 1$

a_1 là số hạng thứ nhất

a_n là số hạng thứ **n**

Tổng $S = n.(a_1 + a_n) : 2$

Số hạng thứ **n** của dãy là $a_n = a_1 + (n - 1).d$

b) Tổng có dạng: $S = 1 + a + a^2 + a^3 + \ldots.+ a^n$ **(2)**

B1: Nhân vào hai vế của đẳng thức với số **a** ta được.

$a.S = a + a^2 + a^3 + a^4 + \ldots.+ a^{n+1}$ (3)

B2: Lấy (3) trừ (2) vế theo vế được:

$a.S - S = a^{n+1} - 1 \Rightarrow S = \frac{a^{n+1} - 1}{a - 1}$

c) Tổng có dạng: $S = 1 + a^2 + a^4 + a^6 + \ldots.+ a^{2n}$ **(4)**

B1: Nhân vào hai vế của đẳng thức với số a^2 ta được.

$a^2.S = a^2 + a^4 + a^6 + a^8 + \ldots.+ a^{2n+2}$ (5)

B2: Lấy (5) trừ (4) vế theo vế được:

$a^2.S - S = a^{2n+2} - 1 \Rightarrow S = \frac{a^{2n+2}-1}{a^2-1}$

d) Tổng có dạng: $S = a + a^3 + a^5 + a^7 + \ldots + a^{2n+1}$ **(6)**

B1: Nhân vào hai vế của đẳng thức với số a^2 ta được.

$a^2.S = a^3 + a^5 + a^7 + a^9 + \ldots + a^{2n+3}$ (7)

B2: Lấy **(7)** trừ **(6)** vế theo vế được:

$a^2.S - S = a^{2n+3} - a \Rightarrow S = \frac{a^{2n+2}-a}{a^2-1}$

d) Tổng có dạng: $S = 1.2 + 2.3 + 3.4 + 4.5 + \ldots + (n-1).n$ **(8)**

Vì khoảng cách giữa 2 thừa số trong mỗi số hạng bằng 1

=> Nhân vào hai vế của đẳng thức **(8)** với 3 lần khoảng cách (nhân với 3) ta được.

$3.S = 1.2.3 + 2.3.3 + 3.4.3 + 4.5.3 + \ldots + (n-2).(n-1).3 + (n-1).n.3$

$= 1.2.3 + 2.3.(4-1) + 3.4.(5-2) + \ldots + (n-2).(n-1).[n-(n-3)]$

$+ (n-1).n.[(n+1)-(n-2)]$

$= (n-1).n.(n+1)$

$\Rightarrow \quad S = \frac{(n-1).n.(n+1)}{3}$

e) Tổng có dạng: $P = 1^2 + 2^2 + 3^2 + 4^2 + \ldots + n^2$ **(9)**

Áp dụng công thức tổng (8) là: $S = 1.2 + 2.3 + 3.4 + 4.5 + \ldots + n(n+1)$

$S = 1.(1+1) + 2(2+1) + 3(3+1) + 4(4+1) + \ldots + n(n+1)$

$= (1^2 + 2^2 + 3^2 + 4^2 + \ldots + n^2) + (1 + 2 + 3 + \ldots + n)$

$= P + (1 + 2 + 3 + \ldots + n)$

$\Rightarrow \quad P = S - (1 + 2 + 3 + \ldots + n)$

Trong đó theo **(8)** thì $S = \frac{n.(n+1)(n+2)}{3}$

Theo **(1)** thì $(1 + 2 + 3 + \ldots + n) = \frac{n(n+1)}{2}$

$\Rightarrow \quad P = \frac{n(n+1)(2n+1)}{6}$

f) Tổng có dạng: $S = 1^2 + 3^2 + 5^2 + \ldots + (k-1)^2$ **(10) với k chẵn và $k \in N$**

Áp dụng tổng $A = 1.2 + 2.3 + 3.4 + 4.5 + \ldots + (k-2)(k-1) + (k-1).k$

$= 0.1 + 1.2 + 2.3 + 3.4 + 4.5 + \ldots + (k-2)(k-1) + (k-1).k$

$= 1(0+2) + 3(2+4) + 5(4+6) + \ldots + (k-1).[(k-2) + k]$

$= 1.2 + 3.6 + 5.10 + \ldots + (k-1).(2k-2)$

$= 1.1.2 + 3.3.2 + 5.5.2 + \ldots + (k-1).(k-1).2$

$= 2.[1^2 + 3^2 + 5^2 + ...+ (k-1)^2]$

$= 2.S$

⇨ $S = \frac{A}{2}$ mà theo **(8)** thì tổng $A = \frac{(k-1).k.(k+1)}{3}$ => $S = \frac{(k-1).k.(k+1)}{6}$

g) Tổng có dạng: $S = a_1.a_2 + a_2.a_3 + a_3.a_4 + a_4.a_5 + ...+ a_{n-1}.a_n$ (11)

*** Với $a_2 - a_1 = a_3 - a_2 = ...= a_n - a_{n-1} = 2$**

$S = a_1.(a_1 + 2) + a_2.(a_2 + 2) + a_3.(a_3 + 2) + a_4.(a_4 + 2) + ...+ a_{n-1}.(a_{n-1} + 2)$

$= \left(a_1^2 + a_2^2 + a_3^2 + ... + a_{n-1}^2\right) + 2\left(a_1 + a_2 + a_3 + ... + a_{n-1}\right)$

$= S_1 + k.S_2$

Trong đó tổng $S_1 = a_1^2 + a_2^2 + a_3^2 + ... + a_{n-1}^2$

$S_2 = a_1 + a_2 + a_3 + ... + a_{n-1}$

*** Với $a_2 - a_1 = a_3 - a_2 = ...= a_n - a_{n-1} = k > 2$**

Nhân cả hai vế với **3k** , rồi tách **3k** ở mỗi số hạng để tạo thành các số hạng mới tự triệt tiêu.

h) Tổng có dạng: $S = \frac{1}{a_1a_2} + \frac{1}{a_2a_3} + \frac{1}{a_3a_4} + ... + \frac{1}{a_{n-1}a_n}$ (12)

*** Với $a_2 - a_1 = a_3 - a_2 = a_4 - a_3 = ... = a_n - a_{n-1} = 1$** thì:

$S = \frac{1}{a_1} - \frac{1}{a_2} + \frac{1}{a_2} - \frac{1}{a_3} + \frac{1}{a_3} - \frac{1}{a_4} + ... + \frac{1}{a_{n-1}} - \frac{1}{a_n} = \frac{1}{a_1} - \frac{1}{a_n}$

*** Với $a_2 - a_1 = a_3 - a_2 = a_4 - a_3 = ... = a_n - a_{n-1} = k > 1$** thì:

$S = \frac{1}{k}\left(\frac{1}{a_1} - \frac{1}{a_2} + \frac{1}{a_2} - \frac{1}{a_3} + \frac{1}{a_3} - \frac{1}{a_4} + ... + \frac{1}{a_{n-1}} - \frac{1}{a_n}\right) = \frac{1}{k}\left(\frac{1}{a_1} - \frac{1}{a_n}\right)$

B.BÀI TOÁN TỰ LUYỆN

Bài 1.

Tính tổng : $S = \frac{27.4500 + 135.550.2}{2 + 4 + 6 + ... + 18}$

Bài 2.

Tính:

$a) A = \frac{101 + 100 + 99 + 98 + ... + 3 + 2 + 1}{101 - 100 + 99 - 98 + ... + 3 - 2 + 1}$

$b) B = \frac{423134.846267 - 423133}{423133.846267 + 423134}$

Bài 3.

Kết quả của phép tính $1 - 2 + 3 - 4 + 5 - 6 + ... + 99 - 100$ bằng:

A. 50 B. −50 C. −100 D. 0

Bài 4.

Tính tỉ số $\frac{A}{B}$, biết: $A=\frac{1}{3.8}+\frac{1}{8.13}+\frac{1}{13.18}+\frac{1}{18.21};B=\frac{1}{3.7}+\frac{1}{7.11}+\frac{1}{11.15}+\frac{1}{15.19}+\frac{1}{19.23}$

A. $\frac{A}{B}=\frac{5}{4}$ B. $\frac{A}{B}=1$ C. $\frac{A}{B}=\frac{4}{5}$ D. $\frac{A}{B}=20.$

Bài 5.

Tính hợp lý

a) $53.81-47.14+81.47-14.53$ b) $\left|1-2^{100}\right|+\left|5^{50}-2^{100}\right|-\left|11-5^{50}\right|$

c) $\left(\frac{20162016}{20172017}+\frac{2017^{2016}}{2017^{2017}}\right)-\left(\frac{2016}{2017}-\frac{2016^{2017}.2017^{2016}}{2017^{2017}.2016^{2016}}\right)$ d) $\frac{6^{36}.\left(50.5^{40}-10.5^{34}\right)}{30^{30}.10^{4}.\left(100.15^{5}-4.3^{5}\right)}$

Bài 6.

Cho biểu thức $A=\frac{5.4^{2017}-4^{2018}-1}{1+4+4^2+.....+4^{2016}}$. Chứng tỏ rằng biểu thức A có giá trị là một số nguyên.

Bài 7.

Không quy đồng hãy tính tổng sau:

$A=\frac{-1}{20}+\frac{-1}{30}+\frac{-1}{42}+\frac{-1}{56}+\frac{-1}{72}+\frac{-1}{90}$

Bài 8.

Tính giá trị các biểu thức sau:

a) $A=68.74+27.68-68$

b) $B=2^3.5^3-3\left\{539-\left[639-8.\left(7^8:7^6+2017^0\right)\right]\right\}$

c) $C=\left(\frac{151515}{161616}+\frac{17^9}{17^{10}}\right)-\left(\frac{1500}{1600}-\frac{1616}{1717}\right)$

d) $D=\left(\frac{1}{2^2}-1\right)\left(\frac{1}{3^2}-1\right)\left(\frac{1}{4^2}-1\right).....\left(\frac{1}{100^2}-1\right)$

Bài 9.

Tính: $\left[92-\frac{1}{9}-\frac{2}{10}-\frac{3}{11}-....-\frac{92}{100}\right]:\left[\frac{1}{45}+\frac{1}{50}+\frac{1}{55}+.....+\frac{1}{500}\right]$

Bài 10.

Thực hiện phép tính

a) $A=\frac{5.\left(2^2.3^2\right)^9.\left(2^2\right)^6-2.\left(2^2.3\right)^{14}.3^4}{5.2^{28}.3^{18}-7.2^{29}.3^{18}}$

b) $B=81.\left[\dfrac{12-\dfrac{12}{7}-\dfrac{12}{289}-\dfrac{12}{85}}{4-\dfrac{4}{7}-\dfrac{4}{289}-\dfrac{4}{85}}:\dfrac{5+\dfrac{5}{13}+\dfrac{5}{169}+\dfrac{5}{91}}{6+\dfrac{6}{13}+\dfrac{6}{169}+\dfrac{6}{91}}\right].\dfrac{158158158}{711711711}$

Bài 11.

Cho $A=\dfrac{1}{2}+\dfrac{3}{2}+\left(\dfrac{3}{2}\right)^2+\left(\dfrac{3}{2}\right)^3+\left(\dfrac{3}{2}\right)^4+.....+\left(\dfrac{3}{2}\right)^{2012}$ và $B=\left(\dfrac{3}{2}\right)^{2013}:2$

Tính *B - A*

Bài 12.

Tính giá trị các biểu thức sau:

a) $A=(-1).(-1)^2.(-1)^3.(-1)^4.....(-1)^{2010}.(-1)^{2011}$

b) $B=70.\left(\dfrac{131313}{565656}+\dfrac{131313}{727272}+\dfrac{131313}{909090}\right)$

c) $C=\dfrac{2a}{3b}+\dfrac{3b}{4c}+\dfrac{4c}{5d}+\dfrac{5d}{2a}$ biết $\dfrac{2a}{3b}=\dfrac{3b}{4c}=\dfrac{4c}{5d}=\dfrac{5d}{2a}$

Bài 13.

1.Thực hiện tính A bằng cách hợp lý nhất:

$A=\dfrac{2010.2011-1005}{2010.2010+1005}$

2.Thực hiện phép tính: $B=33\left(1-\dfrac{2}{3}\right)\left(1-\dfrac{2}{5}\right).....\left(1-\dfrac{2}{99}\right)$

Bài 14.

Tính giá trị biểu thức sau:

a) $4\dfrac{1}{7}+\dfrac{-1}{6}.\left(12-5\dfrac{1}{7}\right)$

b) $(2+4+6+8+....+2014)-(3+5+7+9+.....+2011)$

c) $\left(1-\dfrac{1}{3}\right)\left(1-\dfrac{1}{6}\right)\left(1-\dfrac{1}{10}\right)\left(1-\dfrac{1}{15}\right).....\left(1-\dfrac{1}{780}\right)$

Bài 15.

Thực hiện các phép tính sau một cách hợp lý:

a) $\left(10^2+11^2+12^2\right):\left(13^2+14^2\right)$

b) $1.2.3...9-1.2.3....8-1.2.3....7.8^2$

c) $\dfrac{\left(3.4.2^{16}\right)^2}{11.2^{13}.4^{11}-16^9}$

d)$1152-(374+1152)+(-65+374)$

e)$13-12+11+10-9+8-7-6+5-4+3+2-1$

Bài 16.

Cho $A=\frac{4}{7.31}+\frac{6}{7.41}+\frac{9}{10.41}+\frac{7}{10.57}$ và $B=\frac{7}{19.31}+\frac{5}{19.43}+\frac{3}{23.43}+\frac{11}{23.57}$

Tỷ số $\frac{A}{B}$ là:

A. $\frac{7}{4}$ B. $\frac{7}{2}$ C. $\frac{5}{2}$ D. $\frac{11}{4}$

Bài 17.

Tính giá trị biểu thức sau:

$$B=\left(2017-\frac{1}{4}-\frac{2}{5}-\frac{3}{6}-\frac{4}{7}-.....-\frac{2017}{2020}\right):\left(\frac{1}{20}+\frac{1}{25}+\frac{1}{30}+\frac{1}{35}+.....+\frac{1}{10100}\right)$$

Bài 18.

a) Tính nhanh: $\frac{3^2}{1.4}+\frac{3^2}{4.7}+\frac{3^2}{7.10}+.....+\frac{3^2}{97.100}$

b) $B=(-528)+(-12)+(-211)+540+2225$

c) $M=\frac{1+3+3^2+3^3+....+3^{2012}}{3^{2014}-3}$

d) $D=\frac{2}{20}+\frac{2}{30}+\frac{2}{42}+\frac{2}{56}+\frac{2}{72}+\frac{2}{90}$

Bài 19.

Tính giá trị của các biểu thức sau:

1)$-1-2+3+4-5-6+7+8-.....-2013-2014+2015+2016$

2)$B=\left(\frac{1}{2}-1\right):\left(\frac{1}{3}-1\right):\left(\frac{1}{4}-1\right):\left(\frac{1}{5}-1\right):.....:\left(\frac{1}{98}-1\right):\left(\frac{1}{99}-1\right):\left(\frac{1}{100}-1\right)$

Bài 20.

Cho $E=\frac{1}{1.101}+\frac{1}{2.102}+\frac{1}{3.103}+.....+\frac{1}{10.110}$

Và $F=\frac{1}{1.11}+\frac{1}{2.12}+\frac{1}{3.13}+.....+\frac{1}{100.110}$. Tính tỉ số $\frac{E}{F}$

Bài 21.

Thực hiện phép tính (tính hợp lý nếu có thể)

a)$1968:16+5136:16-704:16$

b) $2^3.5^3-3\left\{400-\left[673-2^3.\left(7^8:7^6+7^0\right)\right]\right\}$

Bài 22.

Tính giá trị biểu thức $A=\dfrac{1+3+5+....+19}{21+23+25+....+39}$

Bài 23.

Tính: $A=\dfrac{1}{4.9}+\dfrac{1}{9.14}+\dfrac{1}{14.19}+.....+\dfrac{1}{64.69}$

Bài 24.

Thực hiện phép tính $A=81.\left[\dfrac{12-\dfrac{12}{7}-\dfrac{12}{289}-\dfrac{12}{85}}{4-\dfrac{4}{7}-\dfrac{4}{289}-\dfrac{4}{85}}:\dfrac{5+\dfrac{5}{13}+\dfrac{5}{169}+\dfrac{5}{91}}{6+\dfrac{6}{13}+\dfrac{6}{169}+\dfrac{6}{91}}\right].\dfrac{158158158}{711711711}$

Bài 25.

Thực hiện phép tính: $A=\dfrac{5.\left(2^2.3^2\right)^9.\left(2^2\right)^6-2.\left(2^2.3\right)^{14}.3^4}{5.2^{28}.3^{18}-7.2^{29}.3^{18}}$

Bài 26.

Thực hiện phép tính

a) $-32.56-32.25-32.19$

b) $2^4.5-\left[131-\left(13-4\right)^2\right]$

c) $\dfrac{9^3.25^3}{18^2.125^2}$

Bài 27.

Cho $A=\dfrac{2}{11.15}+\dfrac{2}{15.19}+\dfrac{2}{19.23}+.....+\dfrac{2}{51.55}$; $B=\left(-\dfrac{5}{3}\right).\dfrac{11}{2}.\left(\dfrac{1}{3}+1\right)$

Tính tích A.B

Bài 28.

Rút gọn phân số: $\dfrac{\left(-2\right)^3.3^3.5^3.7.8}{3.5^3.2^4.42}$

Bài 29.

Không quy đồng hãy tính hợp lý các tổng sau:

a) $A=\dfrac{-1}{20}+\dfrac{-1}{30}+\dfrac{-1}{42}+\dfrac{-1}{56}+\dfrac{-1}{72}+\dfrac{-1}{90}$

$b)\ B=\dfrac{5}{2.1}+\dfrac{4}{1.11}+\dfrac{3}{11.2}+\dfrac{1}{2.15}+\dfrac{13}{15.4}$

Bài 30.

Tính giá trị các biểu thức sau:

$a)A=(-1).(-1)^2.(-1)^3.(-1)^4.....(-1)^{2010}.(-1)^{2011}$

$b)B=70.\left(\dfrac{131313}{565656}+\dfrac{131313}{727272}+\dfrac{131313}{909090}\right)$

$c)C=\dfrac{2a}{3b}+\dfrac{3b}{4c}+\dfrac{4c}{5d}+\dfrac{5d}{2a}$ biết $\dfrac{2a}{3b}=\dfrac{3b}{4c}=\dfrac{4c}{5d}=\dfrac{5d}{2a}$

Bài 31.

Thực hiện phép tính

$A=\left[540:(23,7-19,7)\right]+42.(132+75-36)-7317$

$B=\dfrac{2^{10}.13+2^{10}.65}{2^8.104}$

Bài 32.

Tính tổng $A=1.2+2.3+3.4+.....+98.99$

Bài 33.

Rút gọn biểu thức: $\dfrac{10.11+50.55+70.77}{11.12+55.60+77.84}$

Bài 34.

Tính hợp lý

$a)21.7^2-11.7^2+90.7^2+49.125.16$

$b)\dfrac{5.4^{15}.9^9-4.3^{20}.8^9}{5.2^9.6^{19}-7.2^{29}.27^6}$

Bài 35.

Tính giá trị các biểu thức sau:

$a)A=\dfrac{5}{6}+6\dfrac{5}{6}\left(11\dfrac{5}{20}-9\dfrac{1}{4}\right):8\dfrac{1}{3}$

$b)B=2^3.5^3-3\left\{400-\left[673-2^3.\left(7^8:7^6+7^0\right)\right]\right\}$

$c)C=\dfrac{5}{2.1}+\dfrac{4}{1.11}+\dfrac{3}{11.2}+\dfrac{1}{2.15}+\dfrac{13}{15.4}$

Bài 36.

Thực hiện phép tính

a) $A=\dfrac{5.\left(2^2.3^2\right)^9.\left(2^2\right)^6-2.\left(2^2.3\right)^{14}.3^4}{5.2^{28}.3^{18}-7.2^{29}.3^{18}}$

b) $B=81.\left[\dfrac{12-\dfrac{12}{7}-\dfrac{12}{289}-\dfrac{12}{85}}{4-\dfrac{4}{7}-\dfrac{4}{289}-\dfrac{4}{85}}:\dfrac{5+\dfrac{5}{13}+\dfrac{5}{169}+\dfrac{5}{91}}{6+\dfrac{6}{13}+\dfrac{6}{169}+\dfrac{6}{91}}\right].\dfrac{158158158}{711711711}$

Bài 37.

Thực hiện phép tính

$a)\ A=\dfrac{24.47-23}{24+47-23}.\dfrac{3+\dfrac{3}{7}-\dfrac{3}{11}+\dfrac{3}{1001}-\dfrac{3}{13}}{\dfrac{9}{1001}-\dfrac{9}{13}+\dfrac{9}{7}-\dfrac{9}{11}+9}$

$b)M=\dfrac{1+2+2^2+2^3+.....+2^{2012}}{2^{2014}-2}$

Bài 38.

Thực hiện phép tính (tính hợp lý nếu có thể)

$a)1968:16+5136:16-704:16$

$b)2^3.5^3-3\left\{400-\left[673-2^3.\left(7^8:7^6+7^0\right)\right]\right\}$

Bài 39.

Tính $N=\dfrac{5.\left(2^2.3^2\right)^9.\left(2^2\right)^6-2.\left(2^2.3\right)^{14}.3^{16}}{5.2^{28}.3^{19}-7.2^{29}.3^{18}}$

Bài 40.

Thực hiện các phép tính sau một cách hợp lý:

$a)\left(10^2+11^2+12^2\right):\left(13^2+14^2\right)$

$b)1.2.3...9-1.2.3....8-1.2.3....7.8^2$

$c)\dfrac{\left(3.4.2^{16}\right)^2}{11.2^{13}.4^{11}-16^9}$

$d)1152-\left(374+1152\right)+\left(-65+374\right)$

$e)13-12+11+10-9+8-7-6+5-4+3+2-1$

Bài 41. Thực hiện các phép tính sau:

a) $\dfrac{2181.729+243.81.27}{3^2.9^2.234+18.54.162.9+723.729}$

b) $\frac{1}{1.2}+\frac{1}{2.3}+\frac{1}{3.4}+\cdots+\frac{1}{98.99}+\frac{1}{99.100}$

c) $\frac{5.4^{15}-9^9-4.3^{20}.8^9}{5.2^9.6^{19}-7.2^{29}.27^6}$

Bài 42. Tính nhanh: $A=\frac{1.5.6+2.10.12+4.20.24+9.45.54}{1.3.5+2.6.10+4.12.20+9.27.45}$

Bài 43. Tính tổng: $\frac{2}{1.4}+\frac{2}{4.7}+\frac{2}{7.10}+\ldots+\frac{2}{97.100}$.

Bài 44. Tính giá trị biểu thức $\frac{2^{12}.13+2^{12}.65}{2^{10}.104}+\frac{3^{10}.11+3^{10}.5}{3^9.2^4}$

Bài 45. Thực hiện phép tính bằng cách hợp lí :

$A=\frac{636363.37-373737.63}{1+2+3+....+2006}$.

$B=1\frac{6}{41}.\left(\frac{12+\frac{12}{19}-\frac{12}{37}-\frac{12}{53}}{3+\frac{1}{3}-\frac{3}{37}-\frac{3}{53}}:\frac{4+\frac{4}{17}+\frac{4}{19}+\frac{4}{2006}}{5+\frac{5}{17}+\frac{5}{19}+\frac{5}{2006}}\right).\frac{124242423}{237373735}$.

Bài 46. Tính:

C = $\frac{101+100+99+98+...+3+2+1}{101-100+99-98+...+3-2+1}$;

D = $\frac{1}{2^2}+\frac{1}{3^2}+\frac{1}{4^2}+\ldots+\frac{1}{100^2}<1$.

Bài 47. Tính tổng S = $\frac{27+4500+135+550.2}{2+4+6+....14+16+18}$.

Bài 48. Tính tổng $A=\frac{1}{3}+\frac{1}{3^2}+\frac{1}{3^3}+...+\frac{1}{3^{100}}$

Bài 49. Tính:

A= $\frac{5}{11.16}+\frac{5}{16.21}+\frac{5}{21.26}+...+\frac{5}{61.66}$.

B= $\frac{1}{2}+\frac{1}{6}+\frac{1}{12}+\frac{1}{20}+\frac{1}{30}+\frac{1}{42}$.

C = $\frac{1}{1.2}+\frac{1}{2.3}+...+\frac{1}{1989.1990}+...+\frac{1}{2006.2007}$.

Bài 50. Tính giá trị biểu thức: $\frac{2^{12}.13+2^{12}.65}{2^{10}.104} + \frac{3^{10}.11+3^{10}.5}{3^9.2^4}$

Bài 51. Cho $A=\frac{34}{7.13}+\frac{51}{13.22}+\frac{85}{22.37}+\frac{68}{37.49}$, $B=\frac{39}{7.16}+\frac{65}{16.31}+\frac{52}{31.43}+\frac{26}{43.49}$

Tính tỷ số $\frac{A}{B}$.

Bài 52. Thực hiện dãy tính: $\frac{13.4^6.\left(28\frac{7}{13}-27\frac{5}{18}\right)}{59.2^{12}\left(\frac{5}{14}+\frac{5}{84}+\frac{5}{204}+\frac{5}{374}\right)}$

Bài 53. Tính $\frac{21}{54}+\frac{3}{75}:\frac{\left(\frac{39}{65}+0,415-\frac{33}{600}\right):\frac{21}{9}}{7^2-18,25+13\frac{15}{36}-16\frac{17}{102}}$

Bài 54. Tính

a) $A=\frac{101+100+99+98+\ldots+3+2+1}{101-100+99-98+\ldots+3-2+1}$

b) $B=\frac{423134\,.\,846267-423133}{423133\,.\,846267+423134}$.

Bài 55. Tính nhanh:

a) $A=\frac{24.47-23}{24+47-23}.\frac{3+\frac{3}{7}-\frac{3}{11}+\frac{3}{1001}-\frac{3}{13}}{\frac{9}{1001}-\frac{9}{13}+\frac{9}{7}-\frac{9}{11}+9}$

b) $B=(-329)+(-15)+(-101)+440+2019$

c) $M=\frac{1+2+2^2+2^3+\ldots+2^{2012}}{2^{2014}-2}$

Bài 56. Thực hiện phép tính một cách hợp lý:

a) $A=\frac{2}{3}.\frac{2013}{2012}-\frac{2}{3}.\frac{1}{2012}+\frac{1}{3}$

b) $B=\left(\frac{12}{199}+\frac{23}{200}-\frac{34}{201}\right)\left(\frac{1}{2}-\frac{1}{3}-\frac{1}{6}\right)$

c) $C=1500-\left\{5^3.2^3-11\left[7^2-5.2^3+8\left(11^2-121\right)\right]\right\}$

Bài 57. Rút gọn biểu thức: $A=\dfrac{\dfrac{2}{7}+\dfrac{2}{5}+\dfrac{2}{17}-\dfrac{2}{293}}{\dfrac{3}{7}+\dfrac{3}{5}+\dfrac{3}{17}-\dfrac{3}{293}}$.

Bài 58. Thực hiện phép tính bằng cách hợp lí :

a) $(-2013).2014+1007.26$

b) $\left(\dfrac{1313}{1414}+\dfrac{10}{160}\right)-\left(\dfrac{130}{140}-\dfrac{1515}{1616}\right)$

HƯỚNG DẪN

Bài 1. Tính tổng **:**

$$S=\frac{27.4500+135.550.2}{2+4+6+...+18}$$

Lời giải

Xét tử : $27.4500+135.550.2=270.450+270.550=27000$

Xét mẫu: $2+4+6+8+...+18=\frac{(2+18).9}{2}=90$

Suy ra $S=270000:90=3000$

Bài 2.

Tính:

$$a)A=\frac{101+100+99+98+....+3+2+1}{101-100+99-98+....+3-2+1}$$

$$b)B=\frac{423134.846267-423133}{423133.846267+423134}$$

Lời giải

$$a)A=\frac{101.51}{51}=101$$

$$b)\frac{423133.846267+846267-423133}{423133.846267+423134}=1$$

Bài 3.

Kết quả của phép tính $1-2+3-4+5-6+.....+99-100$ bằng:

B. 50 B. -50 C. -100 D. 0

Lời giải

3.B

Bài 4.

Tính tỉ số $\frac{A}{B}$, biết: $A=\frac{1}{3.8}+\frac{1}{8.13}+\frac{1}{13.18}+\frac{1}{18.21};B=\frac{1}{3.7}+\frac{1}{7.11}+\frac{1}{11.15}+\frac{1}{15.19}+\frac{1}{19.23}$

B. $\frac{A}{B}=\frac{5}{4}$ B. $\frac{A}{B}=1$ C. $\frac{A}{B}=\frac{4}{5}$ D. $\frac{A}{B}=20.$

Lời giải

4. C

Bài 5.

Tính hợp lý

a) $53.81-47.14+81.47-14.53$ b) $\left|1-2^{100}\right|+\left|5^{50}-2^{100}\right|-\left|11-5^{50}\right|$

c) $\left(\frac{20162016}{20172017}+\frac{2017^{2016}}{2017^{2017}}\right)-\left(\frac{2016}{2017}-\frac{2016^{2017}.2017^{2016}}{2017^{2017}.2016^{2016}}\right)$ d) $\frac{6^{36}.\left(50.5^{40}-10.5^{34}\right)}{30^{30}.10^4.\left(100.15^5-4.3^5\right)}$

Lời giải

a) $=81.\left(53+47\right)-14.\left(47+53\right)$

$=81.100-14.100$

$=100.\left(81-14\right)$

$=100.67=6700$

b) $=2^{100}-1+5^{50}-2^{100}-5^{50}+11=10$

c) $=\frac{2016}{2017}+\frac{1}{2017}-\frac{2016}{2017}+\frac{2016}{2017}=1$

d) $=\frac{2^{36}.3^{36}.5^{35}.\left(2.5^2.5^{40}-2.5.5^{34}\right)}{\left(2.3.5\right)^{30}.2^4.5^4.\left(2^2.5^2.3^5.5^5-2^2.3^5\right)}=\frac{2^{36}.3^{36}.2.5^{35}.\left(5^7-1\right)}{2^{34}.3^{30}.5^{34}.2^2.3^5.\left(5^7-1\right)}$

$=\frac{2^{37}.3^{36}.5^{35}.\left(5^7-1\right)}{2^{36}.3^{35}.5^{34}.\left(5^7-1\right)}=2.3.5=30$

Bài 6.

Cho biểu thức $A=\frac{5.4^{2017}-4^{2018}-1}{1+4+4^2+.....+4^{2016}}$. Chứng tỏ rằng biểu thức A có giá trị là một số nguyên.

Lời giải

Trước hết tính $M=1+4+4^2+.....+4^{2016}$

$4M=4+4^2+4^3+.....+4^{2016}+4^{2017}=M-1+4^{2017}$

$\Rightarrow 3M=4^{2017}-1$

$A=\frac{\left(4+1\right).4^{2017}-4^{2018}-1}{1+4+4^2+.....+4^{2016}}=\frac{4^{2018}+4^{2017}-4^{2018}-1}{M}=\frac{4^{2017}-1}{M}=3$

Bài 7.

Không quy đồng hãy tính tổng sau:

$A=\frac{-1}{20}+\frac{-1}{30}+\frac{-1}{42}+\frac{-1}{56}+\frac{-1}{72}+\frac{-1}{90}$

Lời giải

$A=\frac{-1}{20}+\frac{-1}{30}+\frac{-1}{42}+\frac{-1}{56}+\frac{-1}{72}+\frac{-1}{90}$

$$=-\left(\frac{1}{4.5}+\frac{1}{5.6}+\frac{1}{6.7}+\cdots+\frac{1}{9.10}\right)=-\left(\frac{1}{4}-\frac{1}{5}+\frac{1}{5}-\frac{1}{6}+\cdots+\frac{1}{9}-\frac{1}{10}\right)=\frac{-3}{20}$$

Bài 8.

Tính giá trị các biểu thức sau:

a) $A=68.74+27.68-68$

b) $B=2^3.5^3-3\left\{539-\left[639-8.\left(7^8:7^6+2017^0\right)\right]\right\}$

c) $C=\left(\frac{151515}{161616}+\frac{17^9}{17^{10}}\right)-\left(\frac{1500}{1600}-\frac{1616}{1717}\right)$

d) $D=\left(\frac{1}{2^2}-1\right)\left(\frac{1}{3^2}-1\right)\left(\frac{1}{4^2}-1\right).....\left(\frac{1}{100^2}-1\right)$

Lời giải

a) $A=68.74+27.68-68=68.\left(74+27-1\right)=68.100=6800$

b) $B=2^3.5^3-3\left\{539-\left[639-8.\left(7^8:7^6+2017^0\right)\right]\right\}$

$=8.125-3.\left\{539-\left[639-8.\left(7^2+1\right)\right]\right\}$

$=1000-3.\left\{539-\left[639+8.50\right]\right\}$

$=1000-3.300=1000-900=100$

c) $C=\left(\frac{151515}{161616}+\frac{17^9}{17^{10}}\right)-\left(\frac{1500}{1600}-\frac{1616}{1717}\right)=\left(\frac{15}{16}+\frac{1}{17}\right)-\left(\frac{15}{16}-\frac{16}{17}\right)$

$=\left(\frac{15}{16}-\frac{15}{16}\right)+\left(\frac{1}{17}+\frac{16}{17}\right)=0+1=1$

d) $D=\left(\frac{1}{2^2}-1\right)\left(\frac{1}{3^2}-1\right)\left(\frac{1}{4^2}-1\right).....\left(\frac{1}{100^2}-1\right)=\left(\frac{1-4}{2^2}\right)\left(\frac{1-9}{3^2}\right).....\left(\frac{1-1000}{100^2}\right)$

$=\frac{-3}{2^2}.\frac{-8}{3^2}.\frac{-15}{4^2}.....\frac{-9999}{100^2}=-\frac{1.3}{2.3}.\frac{2.4}{3.3.}.\frac{3.5}{4.4}.....\frac{99.1010}{100.100}$

$=-\frac{\left(1.2.3.....99\right).\left(3.4.5.....101\right)}{\left(2.3.4.....100\right).\left(2.3.4.....100\right)}=-\frac{101}{200}$

Bài 9.

Tính: $\left[92-\frac{1}{9}-\frac{2}{10}-\frac{3}{11}-....-\frac{92}{100}\right]:\left[\frac{1}{45}+\frac{1}{50}+\frac{1}{55}+.....+\frac{1}{500}\right]$

Lời giải

$$B=\left[92-\frac{1}{9}-\frac{2}{10}-\frac{3}{11}-.....-\frac{92}{100}\right]:\left[\frac{1}{45}+\frac{1}{50}+\frac{1}{55}+.....+\frac{1}{500}\right]$$

$$B=\frac{\left(1-\frac{1}{9}\right)+\left(1-\frac{2}{10}\right)+.....+\left(1-\frac{92}{100}\right)}{\frac{1}{45}+\frac{1}{50}+\frac{1}{55}+.....+\frac{1}{500}}=\frac{\frac{8}{9}+\frac{8}{10}+.....+\frac{8}{100}}{\frac{1}{5}.\left(\frac{1}{9}+\frac{1}{10}+....+\frac{1}{100}\right)}=8:\frac{1}{5}=40$$

Bài 10.

Thực hiện phép tính

a) $A=\frac{5.\left(2^2.3^2\right)^9.\left(2^2\right)^6-2.\left(2^2.3\right)^{14}.3^4}{5.2^{28}.3^{18}-7.2^{29}.3^{18}}$

b) $B=81.\left[\frac{12-\frac{12}{7}-\frac{12}{289}-\frac{12}{85}}{4-\frac{4}{7}-\frac{4}{289}-\frac{4}{85}}:\frac{5+\frac{5}{13}+\frac{5}{169}+\frac{5}{91}}{6+\frac{6}{13}+\frac{6}{169}+\frac{6}{91}}\right].\frac{158158158}{711711711}$

Lời giải

a) Ta có:

$$A=\frac{5.\left(2^2.3^2\right)^9.\left(2^2\right)^6-2.\left(2^2.3\right)^{14}.3^4}{5.2^{28}.3^{18}-7.2^{29}.3^{18}}$$

$$=\frac{5.2^{18}.3^{18}.2^{12}-2.2^{28}.3^{14}.3^4}{5.2^{28}.3^{18}-7.2^{29}.3^{18}}=\frac{5.2^{30}.3^{18}-2^{29}.3^{18}}{2^{28}.3^{18}.\left(5-7.2\right)}$$

$$=\frac{2^{29}.3^{18}.\left(5.2-1\right)}{2^{28}.3^{18}.\left(5-14\right)}=\frac{2.9}{-9}=-2$$

b) Ta có:

$$B=81.\left[\frac{12-\frac{12}{7}-\frac{12}{289}-\frac{12}{85}}{4-\frac{4}{7}-\frac{4}{289}-\frac{4}{85}}:\frac{5+\frac{5}{13}+\frac{5}{169}+\frac{5}{91}}{6+\frac{6}{13}+\frac{6}{169}+\frac{6}{91}}\right].\frac{158158158}{711711711}$$

$$=81.\left[\frac{12.\left(1-\frac{1}{7}-\frac{1}{289}-\frac{1}{85}\right)}{4.\left(1-\frac{1}{7}-\frac{1}{289}-\frac{1}{85}\right)}:\frac{5.\left(1+\frac{1}{13}+\frac{1}{169}+\frac{1}{91}\right)}{6.\left(1+\frac{1}{13}+\frac{1}{169}+\frac{1}{91}\right)}\right].\frac{158.1001001}{711.1001001}$$

$$=81.\left(\frac{12}{4}:\frac{5}{6}\right).\frac{158}{711}=81.\frac{18}{5}.\frac{2}{9}=\frac{324}{5}=64,8$$

Bài 11.

Cho $A=\frac{1}{2}+\frac{3}{2}+\left(\frac{3}{2}\right)^2+\left(\frac{3}{2}\right)^3+\left(\frac{3}{2}\right)^4+.....+\left(\frac{3}{2}\right)^{2012}$ và $B=\left(\frac{3}{2}\right)^{2013}:2$

Tính *B* - *A*

Lời giải

Ta có:

$$A=\frac{1}{2}+\frac{3}{2}+\left(\frac{3}{2}\right)^2+\left(\frac{3}{2}\right)^3+\left(\frac{3}{2}\right)^4+....+\left(\frac{3}{2}\right)^{2012} \quad (1)$$

$$\Rightarrow \frac{3}{2}A=\frac{3}{4}+\left(\frac{3}{2}\right)^2+\left(\frac{3}{2}\right)^3+\left(\frac{3}{2}\right)^4+....+\left(\frac{3}{2}\right)^{2013} \quad (2)$$

Lấy (2) trừ (1) ta được:

$$\frac{3}{2}A-A=\left(\frac{3}{2}\right)^{2013}+\frac{3}{4}-\frac{1}{2}-\frac{3}{2}$$

Vậy $B-A=\frac{3^{2013}}{2^{2014}}-\frac{3^{2013}}{2^{2012}}+\frac{5}{2}$

Bài 12.

Tính giá trị các biểu thức sau:

a) $A=(-1).(-1)^2.(-1)^3.(-1)^4.....(-1)^{2010}.(-1)^{2011}$

b) $B=70.\left(\frac{131313}{565656}+\frac{131313}{727272}+\frac{131313}{909090}\right)$

c) $C=\frac{2a}{3b}+\frac{3b}{4c}+\frac{4c}{5d}+\frac{5d}{2a}$ biết $\frac{2a}{3b}=\frac{3b}{4c}=\frac{4c}{5d}=\frac{5d}{2a}$

Lời giải

a) $-1.1.(-1).....(-1).1.(-1)=-1$

b) $B=70.\left(\frac{13}{56}+\frac{13}{72}+\frac{13}{90}\right)=70.13.\left(\frac{1}{7.8}+\frac{1}{8.9}+\frac{1}{9.10}\right)$

$=70.13.\left(\frac{1}{7}-\frac{1}{10}\right)=39$

c) $\frac{2a}{3b}=\frac{3b}{4c}=\frac{4c}{5d}=\frac{5d}{2a}=k$

Ta có: $\frac{2a}{3b}.\frac{3b}{4c}.\frac{4c}{5d}.\frac{5d}{2a}=k^4\Rightarrow k^4=1\Rightarrow k=\pm 1\Rightarrow C=\pm 4$

Bài 13.

1. Thực hiện tính A bằng cách hợp lý nhất:

$A=\dfrac{2010.2011-1005}{2010.2010+1005}$

2. Thực hiện phép tính: $B=33\left(1-\dfrac{2}{3}\right)\left(1-\dfrac{2}{5}\right).....\left(1-\dfrac{2}{99}\right)$

Lời giải

$1)A=\dfrac{2010.2011-1005}{2010.2010+1005}=\dfrac{2010.\left(2010+1\right)-1005}{2010.2010+1005}=\dfrac{2010.2010+2010-1005}{2010.2010+1005}$

$=\dfrac{2010.2010+1005}{2010.2010+1005}=1$

$2)B=33\left(1-\dfrac{2}{3}\right)\left(1-\dfrac{2}{5}\right).....\left(1-\dfrac{2}{99}\right)=33.\dfrac{1}{3}.\dfrac{3}{5}.\dfrac{5}{7}.....\dfrac{97}{99}=33.\dfrac{1}{99}=\dfrac{1}{3}$

Bài 14.

Tính giá trị biểu thức sau:

$a)4\dfrac{1}{7}+\dfrac{-1}{6}.\left(12-5\dfrac{1}{7}\right)$

$b)\left(2+4+6+8+....+2014\right)-\left(3+5+7+9+.....+2011\right)$

$c)\left(1-\dfrac{1}{3}\right)\left(1-\dfrac{1}{6}\right)\left(1-\dfrac{1}{10}\right)\left(1-\dfrac{1}{15}\right).....\left(1-\dfrac{1}{780}\right)$

Lời giải

$a)4\dfrac{1}{7}+\dfrac{-1}{6}.\left(12-5\dfrac{1}{7}\right)=4\dfrac{1}{7}+\dfrac{-1}{6}.12-\dfrac{-1}{6}.5\dfrac{1}{7}=4\dfrac{1}{7}-2+\dfrac{1}{6}.\dfrac{36}{7}=3$

$b)\left(2+4+6+8+.....+2014\right)-\left(3+5+7+9+.....+2011\right)$

Nhận xét: $\left(2+4+6+8+....+2014\right)$ có 1007 số hạng

$\left(3+5+7+9+....+2011\right)$ có 1005 số hạng

$=\left(2-3\right)+\left(4-5\right)+\left(6-7\right)+\left(2010-2011\right)+\left(2012+2014\right)$ có 1006 nhóm

$=\left(-1\right)+\left(-1\right)+\left(-1\right)+.....+\left(-1\right)+4026$ có 1005 số hạng -1

$=-1005+4026=3021$

$c)\left(1-\dfrac{1}{3}\right)\left(1-\dfrac{1}{6}\right)\left(1-\dfrac{1}{10}\right)\left(1-\dfrac{1}{15}\right).....\left(1-\dfrac{1}{780}\right)$

$=\dfrac{4}{6}.\dfrac{10}{12}.\dfrac{18}{20}\dfrac{28}{30}\cdots\dfrac{1558}{1560}=\dfrac{1.4}{2.3}.\dfrac{2.5}{3.4}.\dfrac{3.6}{4.5}\cdots\dfrac{38.41}{39.40}$

$\dfrac{1.2.3...38}{2.3.4...39}.\dfrac{4.5.6...41}{3.4.5...40}=\dfrac{1}{39}.\dfrac{41}{3}=\dfrac{41}{117}$

Bài 15.

Thực hiện các phép tính sau một cách hợp lý:

a) $\left(10^2+11^2+12^2\right):\left(13^2+14^2\right)$

b) $1.2.3...9-1.2.3....8-1.2.3....7.8^2$

c) $\dfrac{\left(3.4.2^{16}\right)^2}{11.2^{13}.4^{11}-16^9}$

d) $1152-\left(374+1152\right)+\left(-65+374\right)$

e) $13-12+11+10-9+8-7-6+5-4+3+2-1$

Lời giải

a) $\left(10^2+11^2+12^2\right):\left(13^2+14^2\right)=\left(100+121+144\right):\left(169+196\right)=365:365=1$

b) $1.2.3....9-1.2.3...7.8-1.2.3...7.8^2$

$=1.2.3...7.8.\left(9-1-8\right)=1.2.3...7.8...\times 0=0$

c) $\dfrac{\left(3.4.2^{16}\right)^2}{11.2^{13}.4^{11}-16^9}=\dfrac{\left(3.2^2.2^{16}\right)^2}{11.2^{13}.\left(2^2\right)^{11}-\left(2^4\right)^9}=\dfrac{3^2.\left(2^{18}\right)^2}{11.2^{13}.2^{22}-2^{36}}$

$=\dfrac{3^2.2^{36}}{11.2^{35}-2^{36}}=\dfrac{3^2.2^{36}}{2^{35}.\left(11-2\right)}=\dfrac{3^2.2}{9}=2$

d) $1152-\left(374+1152\right)+\left(-65+374\right)$

$=1152-374-1152+-65+374$

$=\left(1152-1152\right)+\left(374-374\right)-65=-65$

e) $13-12+11+10-9+8-7-6+5-4+3+2-1$

$=13-\left(12-11-10+9\right)+\left(8-7-6+5\right)-\left(4-3-2-1\right)=13$

Bài 16.

Cho $A=\dfrac{4}{7.31}+\dfrac{6}{7.41}+\dfrac{9}{10.41}+\dfrac{7}{10.57}$ và $B=\dfrac{7}{19.31}+\dfrac{5}{19.43}+\dfrac{3}{23.43}+\dfrac{11}{23.57}$

Tỷ số $\dfrac{A}{B}$ là:

A. $\dfrac{7}{4}$ B. $\dfrac{7}{2}$ C. $\dfrac{5}{2}$ D. $\dfrac{11}{4}$

Lời giải

16.C

Bài 17.

Tính giá trị biểu thức sau:

$$B=\left(2017-\frac{1}{4}-\frac{2}{5}-\frac{3}{6}-\frac{4}{7}-.....-\frac{2017}{2020}\right):\left(\frac{1}{20}+\frac{1}{25}+\frac{1}{30}+\frac{1}{35}+.....+\frac{1}{10100}\right)$$

Lời giải

$$B=\left(2017-\frac{1}{4}-\frac{2}{5}-\frac{3}{6}-\frac{4}{7}-.....-\frac{2017}{2020}\right):\left(\frac{1}{20}+\frac{1}{25}+\frac{1}{30}+\frac{1}{35}+.....+\frac{1}{10100}\right)$$

$$B=\left((1-\frac{1}{4})+(1-\frac{2}{5})+(1-\frac{3}{6})+\cdots+(1-\frac{2017}{2020})\right):\left(\frac{1}{20}+\frac{1}{25}+\frac{1}{30}+\frac{1}{35}+.....+\frac{1}{10100}\right)$$

$$B=\left(\frac{3}{4}+\frac{3}{5}+\frac{3}{6}+\cdots+\frac{3}{2020}\right):\left(\frac{1}{5}\cdot(\frac{1}{4}+\frac{1}{5}+\frac{1}{6}+.....+\frac{1}{2020})\right)$$

$B=15$

Bài 18.

Tính nhanh:

a) $\frac{3^2}{1.4}+\frac{3^2}{4.7}+\frac{3^2}{7.10}+.....+\frac{3^2}{97.100}$

b) $B=(-528)+(-12)+(-211)+540+2225$

c) $M=\frac{1+3+3^2+3^3+....+3^{2012}}{3^{2014}-3}$

d) $D=\frac{2}{20}+\frac{2}{30}+\frac{2}{42}+\frac{2}{56}+\frac{2}{72}+\frac{2}{90}$

Lời giải

a) $\frac{3^2}{1.4}+\frac{3^2}{4.7}+\frac{3^2}{7.10}+.....+\frac{3^2}{97.100}=3\cdot\left(\frac{3}{1.4}+\frac{3}{4.7}+\frac{3}{7.10}+.....+\frac{3}{97.100}\right)$

$=3\cdot\left(\frac{1}{1}-\frac{1}{4}+\frac{1}{4}-\frac{1}{7}+\frac{1}{7}-\frac{1}{10}+.....+\frac{1}{97}-\frac{1}{100}\right)=3\cdot\left(\frac{1}{1}-\frac{1}{100}\right)=\frac{297}{100}$

b) $B=(-528)+(-12)+(-211)+540+2225=(-540)+540+(-211)+211+2014=2014$

c) $M=\frac{1+3+3^2+3^3+....+3^{2012}}{3^{2014}-3}$

$A=1+3+3^2+3^3+....+3^{2012}\Rightarrow 3A=3+3^2+3^3+....+3^{2012}+3^{2013}$

$\Rightarrow 3A-A=3^{2013}-1$

$B=3^{2014}-3=3\left(3^{2013}-1\right)$

$\Rightarrow M=\frac{1}{6}$

$$D=\frac{2}{20}+\frac{2}{30}+\frac{2}{42}+\frac{2}{56}+\frac{2}{72}+\frac{2}{90}$$

$$D=\frac{2}{4.5}+\frac{2}{5.6}+\frac{2}{6.7}+\frac{2}{7.8}+\frac{2}{8.9}+\frac{2}{9.10}$$

$$D=2\cdot\left(\frac{1}{4}-\frac{1}{5}+\frac{1}{5}-\frac{1}{6}+\frac{1}{6}-\frac{1}{7}+\frac{1}{7}-\frac{1}{8}+\frac{1}{8}-\frac{1}{9}+\frac{1}{9}-\frac{1}{10}\right)$$

$$D=2\cdot\left(\frac{1}{4}-\frac{1}{10}\right)=\frac{3}{10}$$

Bài 19.

Tính giá trị của các biểu thức sau:

$1)-1-2+3+4-5-6+7+8-.....-2013-2014+2015+2016$

$$2)B=\left(\frac{1}{2}-1\right):\left(\frac{1}{3}-1\right):\left(\frac{1}{4}-1\right):\left(\frac{1}{5}-1\right):.....:\left(\frac{1}{98}-1\right):\left(\frac{1}{99}-1\right):\left(\frac{1}{100}-1\right)$$

Lời giải

$1)A=-1-2+3+4-5-6+7+8-9-10+.....-2013-2014+2015+2016$

$=(-1-2+3+4)+(-5-6+7+8)+(-9-10+11+12)+...+(-2013-2014+2015+2016)$

Ta có tổng A có 2016 số hạng nên có $2016:4=504$ nhóm

$A=4+4+4+.....+4$ (tổng có 504 số 4)

$A=4.504=2016$

$$2)B=\left(\frac{1}{2}-1\right):\left(\frac{1}{3}-1\right):\left(\frac{1}{4}-1\right):\left(\frac{1}{5}-1\right):.....:\left(\frac{1}{98}-1\right):\left(\frac{1}{99}-1\right):\left(\frac{1}{100}-1\right)$$

$$B=\left(-\frac{1}{2}\right):\left(-\frac{2}{3}\right):\left(-\frac{3}{4}\right):.....:\left(\frac{-98}{99}\right):\left(\frac{-99}{100}\right)$$

$$B=\left(-\frac{1}{2}\right).\left(-\frac{3}{2}\right).....\left(\frac{-99}{98}\right).\left(-\frac{100}{99}\right)$$

Ta thấy tích B có 99 thừa số âm nên mang dấu âm

$$B=-\frac{1.3.4.5.6.....98.99.100}{2.2.3.4.5.....97.98.99}=\frac{-100}{2.2}=-25$$

Bài 20.

Cho $E=\frac{1}{1.101}+\frac{1}{2.102}+\frac{1}{3.103}+.....+\frac{1}{10.110}$

Và $F=\frac{1}{1.11}+\frac{1}{2.12}+\frac{1}{3.13}+.....+\frac{1}{100.110}$. Tính tỉ số $\frac{E}{F}$

Lời giải

Ta có:

$$E=\frac{1}{1.101}+\frac{1}{2.102}+.....+\frac{1}{10.110}$$

$$E=\frac{1}{100}.\left(\frac{100}{1.101}+\frac{100}{2.102}+.....+\frac{100}{10.110}\right)$$

$$=\frac{1}{100}.\left(1-\frac{1}{101}+\frac{1}{2}-\frac{1}{102}+.....+\frac{1}{10}-\frac{1}{110}\right)$$

$$=\frac{1}{100}.\left[\left(1+\frac{1}{2}+\frac{1}{3}+.....+\frac{1}{10}\right)-\left(\frac{1}{101}+\frac{1}{102}+.....+\frac{1}{110}\right)\right]$$

$$F=\frac{1}{1.11}+\frac{1}{2.12}+.....+\frac{1}{100.110}$$

$$F=\frac{1}{10}.\left(\frac{10}{1.11}+\frac{10}{2.12}+.....+\frac{10}{100.110}\right)$$

$$F=\frac{1}{10}.\left(1-\frac{1}{11}+\frac{1}{2}-\frac{1}{12}+....+\frac{1}{100}-\frac{1}{110}\right)$$

$$F=\frac{1}{10}.\left[\left(1+\frac{1}{2}+\frac{1}{3}+.....+\frac{1}{100}\right)-\left(\frac{1}{11}+\frac{1}{12}+\frac{1}{13}+.....+\frac{1}{110}\right)\right]$$

$$F=\frac{1}{10}.\left[\left(1+\frac{1}{2}+\frac{1}{3}+.....+\frac{1}{10}\right)-\left(\frac{1}{101}+\frac{1}{102}+.....+\frac{1}{110}\right)\right]$$

$$\Rightarrow \frac{E}{F}=\frac{\frac{1}{100}}{\frac{1}{10}}=\frac{1}{10}$$

Bài 21.

Thực hiện phép tính (tính hợp lý nếu có thể)

a) $1968:16+5136:16-704:16$

b) $2^3.5^3-3\left\{400-\left[673-2^3.\left(7^8:7^6+7^0\right)\right]\right\}$

Lời giải

a) $=16.(123+321-44):16=400$

b) $=8.125-3.\{400-[673-8.50]\}$

$=1000-3.\{400-273\}$

$=619$

Bài 22.

Tính giá trị biểu thức $A=\dfrac{1+3+5+....+19}{21+23+25+....+39}$

Lời giải

Ta có:

$1+3+5+....+19=(1+19)+(3+17)+.....+(9+11)=20+20+...+20=100$

$21+23+25+....+39=(21+39)+(23+27)+...+(29+31)=60+60+...+60=300$

$\Rightarrow A=\dfrac{100}{300}=\dfrac{1}{3}$

Bài 23.

Tính: $A=\dfrac{1}{4.9}+\dfrac{1}{9.14}+\dfrac{1}{14.19}+.....+\dfrac{1}{64.69}$

Lời giải

$A=\dfrac{1}{4.9}+\dfrac{1}{9.14}+\dfrac{1}{14.19}+.....+\dfrac{1}{64.69}=\dfrac{1}{5}.\left(\dfrac{1}{4}-\dfrac{1}{9}+\dfrac{1}{9}-\dfrac{1}{14}+....+\dfrac{1}{64}-\dfrac{1}{69}\right)$

$=\dfrac{1}{5}.\left(\dfrac{1}{4}-\dfrac{1}{69}\right)=\dfrac{13}{4.69}$

Bài 24.

Thực hiện phép tính $A=81.\left[\dfrac{12-\dfrac{12}{7}-\dfrac{12}{289}-\dfrac{12}{85}}{4-\dfrac{4}{7}-\dfrac{4}{289}-\dfrac{4}{85}}:\dfrac{5+\dfrac{5}{13}+\dfrac{5}{169}+\dfrac{5}{91}}{6+\dfrac{6}{13}+\dfrac{6}{169}+\dfrac{6}{91}}\right].\dfrac{158158158}{711711711}$

Lời giải

$A=81.\left[\dfrac{12.\left(1-\dfrac{1}{7}-\dfrac{1}{289}-\dfrac{1}{85}\right)}{4.\left(1-\dfrac{1}{7}-\dfrac{1}{289}-\dfrac{1}{85}\right)}:\dfrac{5.\left(1+\dfrac{1}{13}+\dfrac{1}{169}+\dfrac{1}{91}\right)}{6.\left(1+\dfrac{1}{13}+\dfrac{1}{169}+\dfrac{1}{91}\right)}\right].\dfrac{158.1001001}{711.1001001}$

$=81.\left(\dfrac{12}{4}:\dfrac{5}{6}\right).\dfrac{158}{711}=81.\dfrac{18}{5}.\dfrac{2}{9}=\dfrac{324}{5}$

Bài 25.

Thực hiện phép tính: $A=\dfrac{5.\left(2^2.3^2\right)^9.\left(2^2\right)^6-2.\left(2^2.3\right)^{14}.3^4}{5.2^{28}.3^{18}-7.2^{29}.3^{18}}$

Lời giải

$$A=\frac{5.\left(2^2.3^2\right)^9.\left(2^2\right)^6-2.\left(2^2.3\right)^{14}.3^4}{5.2^{28}.3^{18}-7.2^{29}.3^{18}}=\frac{5.2.3^{18}.2^{12}-2.2^{28}.3^{14}.3^4}{5.2^{28}.3^{18}-7.2^{29}.3^{18}}$$

$$=\frac{5.2^{30}.3^{18}-2^{29}.3^{18}}{2^{28}.3^{18}.(5-7.2)}=\frac{2^{29}.3^{18}.\left(5.2-1\right)}{2^{28}.3^{18}.\left(5-14\right)}=\frac{2.9}{-9}=-2$$

Bài 26.

Thực hiện phép tính

a) $-32.56-32.25-32.19$

b) $2^4.5-\left[131-\left(13-4\right)^2\right]$

c) $\frac{9^3.25^3}{18^2.125^2}$

Lời giải

a) $-32.56-32.25-32.19=-32.\left(56+25+19\right)$

$=-32.100=-3200$

b) $2^4.5-\left[131-\left(13-4\right)^2\right]=16.5-\left[131-9^2\right]$

$=80-\left[131-81\right]=30$

c) $\frac{9^3.25^3}{18^2.125^2}=\frac{3^6.5^6}{2^2.3^4.5^6}=\frac{3^2}{2^2}=\frac{9}{4}$

Bài 27.

Cho $A=\frac{2}{11.15}+\frac{2}{15.19}+\frac{2}{19.23}+.....+\frac{2}{51.55}$; $B=\left(-\frac{5}{3}\right).\frac{11}{2}.\left(\frac{1}{3}+1\right)$

Tính tích A.B

Lời giải

$$A=\frac{2}{11.15}+\frac{2}{15.19}+\frac{2}{19.23}+.....+\frac{2}{51.55}$$

$$=\frac{1}{2}\left(\frac{1}{11}-\frac{1}{15}+.....+\frac{1}{51}-\frac{1}{55}\right)=\frac{1}{2}\left(\frac{1}{11}-\frac{1}{55}\right)=\frac{2}{55}$$

$$B=\left(-\frac{5}{3}\right).\frac{11}{2}.\left(\frac{1}{3}+1\right)=\left(-\frac{5}{3}\right).\frac{11}{2}.\frac{4}{3}=\frac{-55.2}{9}$$

$$\Rightarrow A.B=\frac{2}{55}.\left(\frac{-55.2}{9}\right)=\frac{-4}{9}$$

Bài 28.

Rút gọn phân số: $\dfrac{(-2)^3.3^3.5^3.7.8}{3.5^3.2^4.42}$

Lời giải

Bài 29.

Không quy đồng hãy tính hợp lý các tổng sau:

$a) A=\dfrac{-1}{20}+\dfrac{-1}{30}+\dfrac{-1}{42}+\dfrac{-1}{56}+\dfrac{-1}{72}+\dfrac{-1}{90}$ $\qquad$ $b) B=\dfrac{5}{2.1}+\dfrac{4}{1.11}+\dfrac{3}{11.2}+\dfrac{1}{2.15}+\dfrac{13}{15.4}$

Lời giải

$a) A=\dfrac{-1}{20}+\dfrac{-1}{30}+\dfrac{-1}{42}+....+\dfrac{-1}{90}=-\left(\dfrac{1}{4.5}+\dfrac{1}{5.6}+\dfrac{1}{6.7}+....+\dfrac{1}{9.10}\right)$

$=-\left(\dfrac{1}{4}-\dfrac{1}{5}+.....+\dfrac{1}{9}-\dfrac{1}{10}\right)=-\left(\dfrac{1}{4}-\dfrac{1}{10}\right)=\dfrac{-3}{20}$

$b) B=\dfrac{5}{2.1}+\dfrac{4}{1.11}+\dfrac{3}{11.2}+\dfrac{1}{2.15}+\dfrac{13}{15.4}=7.\left(\dfrac{5}{2.7}+\dfrac{4}{7.11}+\dfrac{3}{11.14}+\dfrac{1}{14.15}+\dfrac{13}{15.28}\right)$

$=7.\left(\dfrac{1}{2}-\dfrac{1}{7}+\dfrac{1}{7}-\dfrac{1}{11}+\dfrac{1}{11}-\dfrac{1}{14}+\dfrac{1}{14}-\dfrac{1}{15}+\dfrac{1}{15}-\dfrac{1}{28}\right)=7.\left(\dfrac{1}{2}-\dfrac{1}{28}\right)=3\dfrac{1}{4}$

Bài 30.

Tính giá trị các biểu thức sau:

$a) A=(-1).(-1)^2.(-1)^3.(-1)^4.....(-1)^{2010}.(-1)^{2011}$

$b) B=70.\left(\dfrac{131313}{565656}+\dfrac{131313}{727272}+\dfrac{131313}{909090}\right)$

$c) C=\dfrac{2a}{3b}+\dfrac{3b}{4c}+\dfrac{4c}{5d}+\dfrac{5d}{2a}$ biết $\dfrac{2a}{3b}=\dfrac{3b}{4c}=\dfrac{4c}{5d}=\dfrac{5d}{2a}$

Lời giải

$a) -1.1.(-1).....(-1).1.(-1)=-1$

$b) B=70.\left(\dfrac{13}{56}+\dfrac{13}{72}+\dfrac{13}{90}\right)=70.13.\left(\dfrac{1}{7.8}+\dfrac{1}{8.9}+\dfrac{1}{9.10}\right)=70.13.\left(\dfrac{1}{7}-\dfrac{1}{10}\right)=39$

c) Đặt $\dfrac{2a}{3b}=\dfrac{3b}{4c}=\dfrac{4c}{5d}=\dfrac{5d}{2a}=k$

Ta có: $\dfrac{2a}{3b}.\dfrac{3b}{4c}.\dfrac{4c}{5d}.\dfrac{5d}{2a}=k^4\Rightarrow k^4=1\Rightarrow k=\pm1\Rightarrow C=\pm4$

Bài 31.

Thực hiện phép tính

$A=\left[540:\left(23,7-19,7\right)\right]+42.\left(132+75-36\right)-7317 \qquad B=\dfrac{2^{10}.13+2^{10}.65}{2^8.104}$

Lời giải

$A=\left(540:4\right)+42.171-7317$

$A=135+7182-7317=0$

$B=\dfrac{2^{10}.13+2^{10}.65}{2^8.104}=\dfrac{2^{10}.13.\left(1+5\right)}{2^8.8.13}=\dfrac{2^{10}.13.6}{2^8.2^3.13}=3$

Bài 32.

Tính tổng $A=1.2+2.3+3.4+.....+98.99$

Lời giải

$3A=1.2.3+2.3.3+3.4.3+.....+98.99.3$

$=1.2.3+2.3.\left(4-1\right)+3.4+.\left(5-2\right)+.....+98.99.\left(100-97\right)$

$=1.2.3+2.3.4-1.2.3+3.4.5-2.3.4+....+98.99.100-97.98.99$

$=98.99.100\Rightarrow A=98.33.100=32340$

Bài 33.

Rút gọn biểu thức: $\dfrac{10.11+50.55+70.77}{11.12+55.60+77.84}$

Lời giải

Ta có: $\dfrac{10.11+50.55+70.77}{11.12+55.60+77.84}=\dfrac{10.11.\left(1+5.5+7.7\right)}{11.12.\left(1+5.5+7.7\right)}=\dfrac{5}{6}$

Bài 34.

Tính hợp lý

$a)21.7^2-11.7^2+90.7^2+49.125.16$

$b)\dfrac{5.4^{15}.9^9-4.3^{20}.8^9}{5.2^9.6^{19}-7.2^{29}.27^6}$

Lời giải

$a) 21.7^2 - 11.7^2 + 90.7^2 + 49.125.16 = 7^2.\left(21 - 11 + 90\right) + 49.125.16$

$= 49.100 + 49.100.20 = 49.100\left(1 + 20\right) = 49.100.21$

$b) \dfrac{5.4^{15}.9^9 - 4.3^{20}.8^9}{5.2^9.6^{19} - 7.2^{29}.27^6} = \dfrac{5.2^{30}.3^{18} - 2^2.3^{20}.2^{27}}{5.2^9.2^{19}.3^{19} - 7.2^{29}.3^{18}}$

$= \dfrac{2^{29}.3^{18}.\left(5.2 - 3^2\right)}{2^{28}.3^{18}.\left(5.3 - 7.2\right)} = 2$

Bài 35.

Tính giá trị các biểu thức sau:

$a) A = \dfrac{5}{6} + 6\dfrac{5}{6}\left(11\dfrac{5}{20} - 9\dfrac{1}{4}\right) : 8\dfrac{1}{3}$

$b) B = 2^3.5^3 - 3\left\{400 - \left[673 - 2^3.\left(7^8 : 7^6 + 7^0\right)\right]\right\}$

$c) C = \dfrac{5}{2.1} + \dfrac{4}{1.11} + \dfrac{3}{11.2} + \dfrac{1}{2.15} + \dfrac{13}{15.4}$

Lời giải

$a) \dfrac{5}{6} + \dfrac{41}{6}\left(11\dfrac{1}{4} - 9\dfrac{1}{4}\right) : \dfrac{25}{3} = \dfrac{5}{6} + \dfrac{41}{6}.2.\dfrac{3}{25} = \dfrac{5}{6} + \dfrac{41}{25} = \dfrac{125}{150} + \dfrac{246}{150} = \dfrac{371}{150} = 2\dfrac{71}{150}$

$b) = 8.125 - 3\left\{400 - \left[673 - 8.50\right]\right\} = 1000 - 3.\left\{400 - 273\right\} = 619$

$c) B = \dfrac{5}{2.1} + \dfrac{4}{1.11} + \dfrac{3}{11.2} + \dfrac{1}{2.15} + \dfrac{13}{15.4} = 7.\left(\dfrac{5}{2.7} + \dfrac{4}{7.11} + \dfrac{3}{11.14} + \dfrac{1}{14.15} + \dfrac{13}{15.28}\right)$

$= 7.\left(\dfrac{1}{2} - \dfrac{1}{7} + \dfrac{1}{7} - \dfrac{1}{11} + \dfrac{1}{11} - \dfrac{1}{14} + \dfrac{1}{14} - \dfrac{1}{15} + \dfrac{1}{15} - \dfrac{1}{28}\right) = 7.\left(\dfrac{1}{2} - \dfrac{1}{28}\right) = \dfrac{13}{4}$

Bài 36.

Thực hiện phép tính

$a) \quad A = \dfrac{5.\left(2^2.3^2\right)^9.\left(2^2\right)^6 - 2.\left(2^2.3\right)^{14}.3^4}{5.2^{28}.3^{18} - 7.2^{29}.3^{18}}$

$b) \quad B = 81.\left[\dfrac{12 - \dfrac{12}{7} - \dfrac{12}{289} - \dfrac{12}{85}}{4 - \dfrac{4}{7} - \dfrac{4}{289} - \dfrac{4}{85}} : \dfrac{5 + \dfrac{5}{13} + \dfrac{5}{169} + \dfrac{5}{91}}{6 + \dfrac{6}{13} + \dfrac{6}{169} + \dfrac{6}{91}}\right].\dfrac{158158158}{711711711}$

Lời giải

$a) \quad A = \dfrac{5.\left(2^2.3^2\right)^9.\left(2^2\right)^6 - 2.\left(2^2.3\right)^{14}.3^4}{5.2^{28}.3^{18} - 7.2^{29}.3^{18}} = \dfrac{5.2^{18}.3^{18}.2^{12} - 2.2^{28}.3^{14}.3^4}{5.2^{28}.3^{18} - 7.2^{29}.3^{18}} = \dfrac{5.2^{30}.3^{18} - 2^{29}.3^{18}}{2^{28}.3^{18}.\left(5 - 7.2\right)}$

$$=\frac{2^{29}.3^{18}.(5.2-1)}{2^{28}.3^{18}.(5-14)}=\frac{2.9}{-9}=-2$$

b) Ta có:

$$B=81.\left[\frac{12-\frac{12}{7}-\frac{12}{289}-\frac{12}{85}}{4-\frac{4}{7}-\frac{4}{289}-\frac{4}{85}}:\frac{5+\frac{5}{13}+\frac{5}{169}+\frac{5}{91}}{6+\frac{6}{13}+\frac{6}{169}+\frac{6}{91}}\right].\frac{158158158}{711711711}$$

$$=81.\left[\frac{12.\left(1-\frac{1}{7}-\frac{1}{289}-\frac{1}{85}\right)}{4.\left(1-\frac{1}{7}-\frac{1}{289}-\frac{1}{85}\right)}:\frac{5.\left(1+\frac{1}{13}+\frac{1}{169}+\frac{1}{91}\right)}{6.\left(1+\frac{1}{13}+\frac{1}{169}+\frac{1}{91}\right)}\right].\frac{158.1001001}{711.1001001}$$

$$=81.\left(\frac{12}{4}:\frac{5}{6}\right).\frac{158}{711}=81.\frac{18}{5}.\frac{2}{9}=\frac{324}{5}=64,8$$

Bài 37.

Thực hiện phép tính

$$a)A=\frac{24.47-23}{24+47-23}.\frac{3+\frac{3}{7}-\frac{3}{11}+\frac{3}{1001}-\frac{3}{13}}{\frac{9}{1001}-\frac{9}{13}+\frac{9}{7}-\frac{9}{11}+9}\quad b)M=\frac{1+2+2^2+2^3+.....+2^{2012}}{2^{2014}-2}$$

Lời giải

a) Đặt $A=B.C$

$$B=\frac{24.47-23}{24+47-23}=\frac{1105}{48}$$

$$C=\frac{3\left(1+\frac{1}{7}-\frac{1}{11}+\frac{1}{1001}-\frac{1}{13}\right)}{9\left(\frac{1}{1001}-\frac{1}{13}+\frac{1}{7}-\frac{1}{11}+1\right)}=\frac{1}{3}\frac{1}{2}$$

$$\Rightarrow A=\frac{1105}{144}$$

b) Đặt $A=1+2+2^2+2^3+....+2^{2012}\Rightarrow A=2^{2013}-1$

Đặt $B=2^{2014}-2=2\left(2^{2013}-1\right)\Rightarrow M=\frac{1}{2}$

Bài 38.

Thực hiện phép tính (tính hợp lý nếu có thể)

$$a)1968:165136:16-704:16\qquad b)2^3.5^3-3\left\{400-\left[673-2^3.\left(7^8:7^6+7^0\right)\right]\right\}$$

Lời giải

$a) = 16.\left(123 + 321 - 44\right) : 16 = 400$

$b) = 8.125 - 3.\left\{400 - \left[673 - 8.50\right]\right\}$

$= 1000 - 3.\left\{400 - 273\right\}$

$= 619$

Bài 39.

Tính $N = \dfrac{5.\left(2^2.3^2\right)^9.\left(2^2\right)^6 - 2.\left(2^2.3\right)^{14}.3^{16}}{5.2^{28}.3^{19} - 7.2^{29}.3^{18}}$

Lời giải

$N = \dfrac{5.\left(2^2.3^2\right)^9.\left(2^2\right)^6 - 2.\left(2^2.3\right)^{14}.3^6}{5.2^{28}.3^{19} - 7.2^{29}.3^{18}}$

$= \dfrac{5.2^{30}.3^{18} - 2^{29}.3^{20}}{2^{28}.3^{18}.\left(5.3 - 7.2\right)} = \dfrac{2^{29}.3^{18}.\left(5.2 - 3^2\right)}{2^{28}.3^{18}.\left(15 - 14\right)} = \dfrac{2}{1} = 2$

Bài 40.

Thực hiện các phép tính sau một cách hợp lý:

$a)\left(10^2 + 11^2 + 12^2\right) : \left(13^2 + 14^2\right)$

$b) 1.2.3...9 - 1.2.3....8 - 1.2.3....7.8^2$

$c) \dfrac{\left(3.4.2^{16}\right)^2}{11.2^{13}.4^{11} - 16^9}$

$d) 1152 - \left(374 + 1152\right) + \left(-65 + 374\right)$

$e) 13 - 12 + 11 + 10 - 9 + 8 - 7 - 6 + 5 - 4 + 3 + 2 - 1$

Lời giải

$a)\left(10^2 + 11^2 + 12^2\right) : \left(13^2 + 14^2\right) = \left(100 + 121 + 144\right) : \left(169 + 196\right) = 365 : 365 = 1$

$b) 1.2.3....9 - 1.2.3...7.8 - 1.2.3...7.8^2$

$= 1.2.3...7.8.\left(9 - 1 - 8\right) = 1.2.3...7.8... \times 0 = 0$

$c) \dfrac{\left(3.4.2^{16}\right)^2}{11.2^{13}.4^{11} - 16^9} = \dfrac{\left(3.2^2.2^{16}\right)^2}{11.2^{13}.\left(2^2\right)^{11} - \left(2^4\right)^9} = \dfrac{3^2.\left(2^{18}\right)^2}{11.2^{13}.2^{22} - 2^{36}}$

$= \dfrac{3^2.2^{36}}{11.2^{35} - 2^{36}} = \dfrac{3^2.2^{36}}{2^{35}.\left(11 - 2\right)} = \dfrac{3^2.2}{9} = 2$

$d) 1152-(374+1152)+(-65+374)$

$=1152-374-1152+-65+374$

$=(1152-1152)+(374-374)-65=-65$

$e) 13-12+11+10-9+8-7-6+5-4+3+2-1$

$=13-(12-11-10+9)+(8-7-6+5)-(4-3-2-1)=13$

Bài 41. Thực hiện các phép tính sau:

a) $\dfrac{2181.729+243.81.27}{3^2.9^2.234+18.54.162.9+723.729}$

b) $\dfrac{1}{1.2}+\dfrac{1}{2.3}+\dfrac{1}{3.4}+\cdots+\dfrac{1}{98.99}+\dfrac{1}{99.100}$

c) $\dfrac{5.4^{15}-9^9-4.3^{20}.8^9}{5.2^9.6^{19}-7.2^{29}.27^6}$

Lời giải

a) $\dfrac{2181.729+243.3-81.9}{3^2.9^2.243+9^3.2.6.162+723.729}$

$=\dfrac{2181.729+729^2}{729.243+729.1944+723.729}$

$=\dfrac{729(2181+729)}{729(243+1944+723)}=\dfrac{729.2910}{729.2910}=1$

b) $\dfrac{1}{1.2}+\dfrac{1}{2.3}+\dfrac{1}{3.4}+....+\dfrac{1}{98.99}+\dfrac{1}{99.100}$

Ta có $\dfrac{1}{1.2}=\dfrac{1}{1}-\dfrac{1}{2};\ \dfrac{1}{2.3}=\dfrac{1}{2}-\dfrac{1}{3};\ 1;11;.....;\underbrace{11...11}_{1999cs}.....;\ \dfrac{1}{98.99}=\dfrac{1}{98}-\dfrac{1}{99};\ \dfrac{1}{99.100}=\dfrac{1}{99}-\dfrac{1}{100}$

Vậy :

$\dfrac{1}{1.2}+\dfrac{1}{2.3}+\dfrac{1}{3.4}+....+\dfrac{1}{98.99}+\dfrac{1}{99.100}$

$=\dfrac{1}{1}-\dfrac{1}{2}+\dfrac{1}{2}-\dfrac{1}{3}+\dfrac{1}{3}-\dfrac{1}{4}+\cdots+\dfrac{1}{98}-\dfrac{1}{99}+\dfrac{1}{99}-\dfrac{1}{100}$

$=1-\dfrac{1}{100}=\dfrac{99}{100}.$

c) $\dfrac{5.2^{30}.3^{18}-2^2.3^{20}.2^{27}}{5.2^9.2^{19}.3^{19}-7.2^{29}.3^{18}}=\dfrac{2^{29}.3^{18}(5.2-3)}{2^{28}.3^{18}(5.3-7.2)}=2$

Bài 42. Tính nhanh: $A=\dfrac{1.5.6+2.10.12+4.20.24+9.45.54}{1.3.5+2.6.10+4.12.20+9.27.45}$

Lời giải

$A=\dfrac{1.5.6+2.10.12+4.20.24+9.45.54}{1.3.5+2.6.10+4.12.20+9.27.45}$

$=\dfrac{1.5.6\left(1+2.2.2+4.4.4+9.9.9\right)}{1.3.5\left(1+2.2.2+4.4.4+9.9.9\right)}=\dfrac{1.5.6}{1.3.5}=2$.

Bài 43. Tính tổng: $\dfrac{2}{1.4}+\dfrac{2}{4.7}+\dfrac{2}{7.10}+\ldots+\dfrac{2}{97.100}$.

Lời giải

Ta có $\dfrac{1}{1.4}=\dfrac{1}{3}(\dfrac{1}{1}-\dfrac{1}{4})\Rightarrow\dfrac{2}{1.4}=\dfrac{2}{3}(\dfrac{1}{1}-\dfrac{1}{4})\Rightarrow\ \dfrac{2}{4.7}=\dfrac{2}{3}(\dfrac{1}{4}-\dfrac{1}{7});\dfrac{2}{7.10}=\dfrac{2}{3}(\dfrac{1}{7}-\dfrac{1}{10});....$

.....; $\dfrac{2}{97.100}=\dfrac{2}{3}(\dfrac{1}{99}-\dfrac{1}{100})$

$\Rightarrow\ B=\dfrac{2}{3}(\dfrac{1}{1}-\dfrac{1}{4}+\dfrac{1}{4}-\dfrac{1}{7}+\dfrac{1}{7}-\dfrac{1}{10}+.....+\dfrac{1}{99}-\dfrac{1}{100})$

Bài 44. Tính giá trị biểu thức $\dfrac{2^{12}.13+2^{12}.65}{2^{10}.104}+\dfrac{3^{10}.11+3^{10}.5}{3^9.2^4}$

Lời giải

$\dfrac{2^{12}.13+2^{12}.65}{2^{10}.104}+\dfrac{3^{10}.11+3^{10}.5}{3^9.2^4}=\dfrac{2^{12}.78}{2^{10}.104}+\dfrac{3^{10}.16}{3^9.16}=3+3=6$

$\Rightarrow$ B= $\dfrac{2}{3}(\dfrac{1}{1}-\dfrac{1}{100})=\dfrac{2}{3}.\dfrac{99}{100}=\dfrac{33}{50}$

Bài 45. Thực hiện phép tính bằng cách hợp lí :

$A=\dfrac{636363.37-373737.63}{1+2+3+....+2006}$.

$B=1\dfrac{6}{41}.\left(\dfrac{12+\dfrac{12}{19}-\dfrac{12}{37}-\dfrac{12}{53}}{3+\dfrac{1}{3}-\dfrac{3}{37}-\dfrac{3}{53}}:\dfrac{4+\dfrac{4}{17}+\dfrac{4}{19}+\dfrac{4}{2006}}{5+\dfrac{5}{17}+\dfrac{5}{19}+\dfrac{5}{2006}}\right).\dfrac{124242423}{237373735}$.

Lời giải

$A\ =\ \dfrac{636363.37-373737.63}{1+2+3+....+2006}\ =\ \dfrac{63.(10101.37)-37.(10101.63)}{1+2+3+....+2006}$

$=\dfrac{37.63.(10101-10101)}{1+2+3+....+2006}=\ 0$

$$B = 1\frac{6}{41}.\left(\frac{12+\frac{12}{19}-\frac{12}{37}-\frac{12}{53}}{3+\frac{1}{3}-\frac{3}{37}-\frac{3}{53}}:\frac{4+\frac{4}{17}+\frac{4}{19}+\frac{4}{2006}}{5+\frac{5}{17}+\frac{5}{19}+\frac{5}{2006}}\right).\frac{124242423}{237373735}$$

$$=\frac{47}{41}.\left(\frac{12.\left(1+\frac{1}{19}-\frac{1}{37}-\frac{1}{53}\right)}{3\left(1+\frac{1}{19}-\frac{1}{37}-\frac{1}{53}\right)}:\frac{4\left(1+\frac{1}{17}+\frac{1}{19}+\frac{1}{2006}\right)}{5\left(1-\frac{1}{17}-\frac{1}{19}+\frac{1}{2006}\right)}\right).\frac{41.3.1010101}{47.5.1010101}$$

$$= \frac{47}{41}.(4.\frac{5}{4}).\frac{41.3}{47.5} = 3.$$

Bài 46. Tính:

$$\mathbf{C} = \frac{101+100+99+98+...+3+2+1}{101-100+99-98+...+3-2+1};$$

$$D = \frac{1}{2^2}+\frac{1}{3^2}+\frac{1}{4^2}+\ldots+\frac{1}{100^2}<1.$$

Lời giải

$\mathbf{C} = \frac{101+100+99+98+...+3+2+1}{101-100+99-98+...+3-2+1}$ Ta có:

$101+(100+99+...+3+2+1)$

$=101+101.100:2 \ =101+5050=5151$

$101-100+99-98+...+3-2+1$

$= \underbrace{(101 - 100) + (99 - 98) + ... + (3 - 2)}_{50 \text{ cap}} + 1=50 \ + \ 1 \ = \ 51$

Vậy C = $\frac{5151}{51}=101$.

b) $B = \frac{3737.43-4343.37}{2+4+6+...+100}$

Ta có: $3737.43-4343.37=34.43.101-43.101.37=0$

Vậy $B=0$ (vì $2=4+6+...+100\neq 0$.

Bài 47. Tính tổng $\mathbf{S} = \frac{27+4500+135+550.2}{2+4+6+....14+16+18}$.

Lời giải

$$S = \frac{270.450+270.550}{\frac{(2+18).9}{2}} = \frac{270(450+550)}{90} = \frac{270000}{90} = 3000$$

Bài 48. Tính tổng $A=\frac{1}{3}+\frac{1}{3^2}+\frac{1}{3^3}+...+\frac{1}{3^{100}}$

Lời giải

Ta có $A=\frac{1}{3}+\frac{1}{3^2}+\frac{1}{3^3}+...+\frac{1}{3^{100}}$

$3A=1+\frac{1}{3}+\frac{1}{3^2}+\frac{1}{3^3}+...+\frac{1}{3^{99}}$

$\Rightarrow 3A-A=(1+\frac{1}{3}+\frac{1}{3^2}+\frac{1}{3^3}+...+\frac{1}{3^{99}})-(\frac{1}{3}+\frac{1}{3^2}+\frac{1}{3^3}+...+\frac{1}{3^{100}})$

$\Rightarrow 2A=1-\frac{1}{3^{100}}=\frac{3^{100}-1}{3^{100}}$

Vậy $A=\frac{3^{100}-1}{2.3^{100}}$.

Bài 49. Tính:

$A=\frac{5}{11.16}+\frac{5}{16.21}+\frac{5}{21.26}+...+\frac{5}{61.66}$.

$B=\frac{1}{2}+\frac{1}{6}+\frac{1}{12}+\frac{1}{20}+\frac{1}{30}+\frac{1}{42}$.

$C=\frac{1}{1.2}+\frac{1}{2.3}+...+\frac{1}{1989.1990}+...+\frac{1}{2006.2007}$.

Lời giải

$A=\frac{1}{11}-\frac{1}{16}+\frac{1}{16}-\frac{1}{21}+\frac{1}{21}-\frac{1}{26}+...+\frac{1}{61}-\frac{1}{66}=\frac{1}{11}-\frac{1}{66}=\frac{5}{66}$.

$B=1-\frac{1}{2}+\frac{1}{2}-\frac{1}{3}+\frac{1}{3}-\frac{1}{4}+\frac{1}{4}-\frac{1}{5}+\frac{1}{5}-\frac{1}{6}+\frac{1}{6}-\frac{1}{7}=1-\frac{1}{7}=\frac{6}{7}$.

$C=1-\frac{1}{2}+\frac{1}{2}-\frac{1}{3}+...+\frac{1}{1989}-\frac{1}{1990}+...+\frac{1}{2006}-\frac{1}{2007}=1-\frac{1}{2007}=\frac{2006}{2007}$.

Bài 50. Tính giá trị biểu thức: $\frac{2^{12}.13+2^{12}.65}{2^{10}.104}+\frac{3^{10}.11+3^{10}.5}{3^9.2^4}$

Lời giải

$\frac{2^{12}.13+2^{12}.65}{2^{10}.104}+\frac{3^{10}.11+3^{10}.5}{3^9.2^4}=3+3=6$

Bài 51. Cho $A=\frac{34}{7.13}+\frac{51}{13.22}+\frac{85}{22.37}+\frac{68}{37.49}$, $B=\frac{39}{7.16}+\frac{65}{16.31}+\frac{52}{31.43}+\frac{26}{43.49}$

Tính tỷ số $\frac{A}{B}$.

Lời giải

Ta có:

$$A=\frac{34}{7.13}+\frac{51}{13.22}+\frac{85}{22.37}+\frac{68}{37.49}=\frac{34}{6}\left(\frac{1}{7}-\frac{1}{13}\right)+.....+\frac{68}{12}\left(\frac{1}{37}-\frac{1}{49}\right)=\frac{17}{3}\left(\frac{1}{7}-\frac{1}{49}\right)$$

$$B=\frac{39}{7.16}+\frac{65}{16.31}+\frac{52}{31.43}+\frac{26}{43.49}=\frac{39}{9}\left(\frac{1}{7}-\frac{1}{16}\right)+.....+\frac{26}{6}\left(\frac{1}{43}-\frac{1}{49}\right)=\frac{13}{3}\left(\frac{1}{7}-\frac{1}{49}\right)\Rightarrow\frac{A}{B}=\frac{34}{49}:\frac{26}{49}=\frac{17}{3}.$$

Bài 52. Thực hiện dãy tính: $\frac{13.4^6.\left(28\frac{7}{13}-27\frac{5}{18}\right)}{59.2^{12}\left(\frac{5}{14}+\frac{5}{84}+\frac{5}{204}+\frac{5}{374}\right)}$.

Lời giải

Ta có: $A=\frac{13.4^6.\frac{295}{13.18}}{59.2^{12}.5.\left(\frac{1}{2.7}+\frac{1}{2.3.7}+\frac{1}{2.3.17}+\frac{1}{2.11.17}\right)}=\frac{2^{12}.295}{59.5.2^{12}.18}.\frac{2.11.17}{5.7}=\frac{187}{315}.$

Bài 53. Tính $\frac{21}{54}+\frac{3}{75}:\frac{\left(\frac{39}{65}+0,415-\frac{33}{600}\right):\frac{21}{9}}{7^2-18,25+13\frac{15}{36}-16\frac{17}{102}}$

Lời giải

Ta có: $\frac{21}{54}+\frac{3}{75}:\frac{0,96.\frac{7}{3}}{30\frac{9}{12}+13\frac{5}{12}-16\frac{1}{6}}=\frac{21}{54}+\frac{3}{75}:\frac{2,24}{28}=\frac{8}{9}.$

Bài 54. Tính

a) $A=\frac{101+100+99+98+\ldots+3+2+1}{101-100+99-98+\ldots+3-2+1}$

b) $B=\frac{423134\,.\,846267-423133}{423133\,.\,846267+423134}$.

Lời giải

a) $A=\frac{101\,.\,51}{51}=101$

b) $B=\dfrac{423133.846267+846267-423133}{423133.846267+423134}=1$

Bài 55. Tính nhanh:

a) $A=\dfrac{24.47-23}{24+47-23}.\dfrac{3+\dfrac{3}{7}-\dfrac{3}{11}+\dfrac{3}{1001}-\dfrac{3}{13}}{\dfrac{9}{1001}-\dfrac{9}{13}+\dfrac{9}{7}-\dfrac{9}{11}+9}$

b) $B=(-329)+(-15)+(-101)+440+2019$

c) $M=\dfrac{1+2+2^2+2^3+\ldots+2^{2012}}{2^{2014}-2}$

Lời giải

a) Đặt $A=E.F$

$E=\dfrac{24.47-23}{24+47-23}=\dfrac{1128-23}{71-23}=\dfrac{1105}{48}$

$F=\dfrac{3\left(1+\dfrac{1}{7}-\dfrac{1}{11}+\dfrac{1}{1001}-\dfrac{1}{13}\right)}{9\left(\dfrac{1}{1001}-\dfrac{1}{13}+\dfrac{1}{7}-\dfrac{1}{11}+1\right)}=\dfrac{1}{3}.$

Suy ra $A=\dfrac{1105}{144}$.

b) $B=(-329)+(-15)+(-101)+440+2019$

$B=(-329-101-10)+440+(2019-5)$

$B=(-440)+440+2014=2014$

c) $M=\dfrac{1+2+2^2+2^3+\ldots+2^{2012}}{2^{2014}-2}$

- Đặt $A=1+2+2^2+2^3+\ldots+2^{2012}$

- Tính được $A=2^{2013}-1$

- Đặt $B=2^{2014}-2$

- Tính được $B=2\left(2^{2013}-1\right)$

- Tính được $M=\dfrac{1}{2}$.

Bài 56. Thực hiện phép tính một cách hợp lý:

a) $A=\frac{2}{3}.\frac{2013}{2012}-\frac{2}{3}.\frac{1}{2012}+\frac{1}{3}$

b) $B=\left(\frac{12}{199}+\frac{23}{200}-\frac{34}{201}\right)\left(\frac{1}{2}-\frac{1}{3}-\frac{1}{6}\right)$

c) $C=1500-\left\{5^3.2^3-11\left[7^2-5.2^3+8\left(11^2-121\right)\right]\right\}$

Lời giải

a) $A=\frac{2}{3}\left(\frac{2013}{2012}-\frac{1}{2012}\right)+\frac{1}{3}=\frac{2}{3}.\frac{2013-1}{2012}+\frac{1}{3}=\frac{2}{3}+\frac{1}{3}=1$

b) $B=\left(\frac{12}{199}+\frac{23}{200}-\frac{34}{201}\right)\left(\frac{3}{6}-\frac{2}{6}-\frac{1}{6}\right)$

$=\left(\frac{12}{199}+\frac{23}{200}-\frac{34}{201}\right)\left(\frac{3}{6}-\frac{3}{6}\right)=\left(\frac{12}{199}+\frac{23}{200}-\frac{34}{201}\right).0=0$

Vậy $B=0$.

c) $C=1500-\left\{5^3.2^3-11\left[7^2-5.2^3+8\left(11^2-121\right)\right]\right\}$

$=1500-\left\{125.8-11\left[49-5.8+8\left(121-121\right)\right]\right\}$

$=1500-\left\{125.8-11\left[49-40+8.0\right]\right\}=1500-\left\{1000-11.9\right\}=599$

Bài 57. Rút gọn biểu thức: $A=\frac{\frac{2}{7}+\frac{2}{5}+\frac{2}{17}-\frac{2}{293}}{\frac{3}{7}+\frac{3}{5}+\frac{3}{17}-\frac{3}{293}}$.

Lời giải

$A=\frac{\frac{2}{7}+\frac{2}{5}+\frac{2}{17}-\frac{2}{293}}{\frac{3}{7}+\frac{3}{5}+\frac{3}{17}-\frac{3}{293}}=\frac{2\left(\frac{1}{7}+\frac{1}{5}+\frac{1}{17}-\frac{1}{293}\right)}{3\left(\frac{1}{7}+\frac{1}{5}+\frac{1}{17}-\frac{1}{293}\right)}=\frac{2}{3}$

Bài 58. Thực hiện phép tính bằng cách hợp lí :

a) $\left(-2013\right).2014+1007.26$

b) $\left(\frac{1313}{1414}+\frac{10}{160}\right)-\left(\frac{130}{140}-\frac{1515}{1616}\right)$

Lời giải

a) $\left(-2013\right).2014+2014.13=2014\left(-2013+13\right)=2014.\left(-2000\right)=-4028000$

b) $\left(\frac{1313}{1414}+\frac{10}{160}\right)-\left(\frac{130}{140}-\frac{1515}{1616}\right)=\frac{13}{14}+\frac{1}{16}-\frac{13}{14}+\frac{15}{16}$

$=\frac{13}{14}-\frac{13}{14}+\frac{1}{16}+\frac{15}{16}=0+\frac{16}{16}=0+1=1$

C.BÀI TOÁN QUA ĐỀ THI HSG

Câu 1. **(Đề thi HSG 6 huyện)**

Thực hiện các phép tính sau:

a) $\dfrac{2181.729+243.81.27}{3^2.9^2.234+18.54.162.9+723.729}$

b) $\dfrac{1}{1.2}+\dfrac{1}{2.3}+\dfrac{1}{3.4}+\cdots+\dfrac{1}{98.99}+\dfrac{1}{99.100}$

c) $\dfrac{5.4^{15}-9^9-4.3^{20}.8^9}{5.2^9.6^{19}-7.2^{29}.27^6}$

Lời giải

a) $\dfrac{2181.729+243.3-81.9}{3^2.9^2.243+9^3.2.6.162+723.729}$

$=\dfrac{2181.729+729^2}{729.243+729.1944+723.729}$

$=\dfrac{729(2181+729)}{729(243+1944+723)}=\dfrac{729.2910}{729.2910}=1$

b) $\dfrac{1}{1.2}+\dfrac{1}{2.3}+\dfrac{1}{3.4}+....+\dfrac{1}{98.99}+\dfrac{1}{99.100}$

Ta có $\dfrac{1}{1.2}=\dfrac{1}{1}-\dfrac{1}{2};\ \dfrac{1}{2.3}=\dfrac{1}{2}-\dfrac{1}{3};\ \dfrac{1}{3.4}=\dfrac{1}{3}-\dfrac{1}{4};\ ....;\ \dfrac{1}{98.99}=\dfrac{1}{98}-\dfrac{1}{99};\ \dfrac{1}{99.100}=\dfrac{1}{99}-\dfrac{1}{100}$

Vậy :

$\dfrac{1}{1.2}+\dfrac{1}{2.3}+\dfrac{1}{3.4}+....+\dfrac{1}{98.99}+\dfrac{1}{99.100}$

$=\dfrac{1}{1}-\dfrac{1}{2}+\dfrac{1}{2}-\dfrac{1}{3}+\dfrac{1}{3}-\dfrac{1}{4}+\cdots+\dfrac{1}{98}-\dfrac{1}{99}+\dfrac{1}{99}-\dfrac{1}{100}$

$=1-\dfrac{1}{100}=\dfrac{99}{100}.$

c) $\dfrac{5.2^{30}.3^{18}-2^2.3^{20}.2^{27}}{5.2^9.2^{19}.3^{19}-7.2^{29}.3^{18}}=\dfrac{2^{29}.3^{18}(5.2-3)}{2^{28}.3^{18}(5.3-7.2)}=2$

Câu 2. **(Đề thi HSG 6 huyện)**

Tính nhanh: $A=\dfrac{1.5.6+2.10.12+4.20.24+9.45.54}{1.3.5+2.6.10+4.12.20+9.27.45}$

Lời giải

$A=\dfrac{1.5.6+2.10.12+4.20.24+9.45.54}{1.3.5+2.6.10+4.12.20+9.27.45}$

$=\dfrac{1.5.6\left(1+2.2.2+4.4.4+9.9.9\right)}{1.3.5\left(1+2.2.2+4.4.4+9.9.9\right)}=\dfrac{1.5.6}{1.3.5}=2.$

Câu 3. **(Đề thi HSG 6 huyện)**

Tính tổng: $\dfrac{2}{1.4}+\dfrac{2}{4.7}+\dfrac{2}{7.10}+\ldots+\dfrac{2}{97.100}$.

Lời giải

Ta có $\frac{1}{1.4}=\frac{1}{3}(\frac{1}{1}-\frac{1}{4})\Rightarrow\frac{2}{1.4}=\frac{2}{3}(\frac{1}{1}-\frac{1}{4})\Rightarrow\frac{2}{4.7}=\frac{2}{3}(\frac{1}{4}-\frac{1}{7});\frac{2}{7.10}=\frac{2}{3}(\frac{1}{7}-\frac{1}{10});....$

.....; $\frac{2}{97.100}=\frac{2}{3}(\frac{1}{99}-\frac{1}{100})$

$\Rightarrow$ B= $\frac{2}{3}(\frac{1}{1}-\frac{1}{4}+\frac{1}{4}-\frac{1}{7}+\frac{1}{7}-\frac{1}{10}+.....+\frac{1}{99}-\frac{1}{100})$

Câu 4. **(Đề thi HSG 6 huyện)**

Tính tổng $S=1.2+2.3+3.4+...+99.100$

Lời giải

$S=1.2+2.3+3.4+...+99.100$

$3S=3(1.2+2.3+3.4+...+99.100)$

= 1.2.3 + 2.3.3 + 3.4.3 + ... + 99.100.3

= 1.2.3 +2.3.(4 - 1) + 3.4.(5 - 2) + ... + 99.100.(101 - 98)

= 1.2.3 - 1.2.3 + 2.3.4 - 2.3.4 + 3.4.5 - ... - 98.99.100 + 99.100.101

Vậy S = 99.100.101: 3 = 33. 100 . 101 = 333300

Câu 5. **(Đề thi HSG 6 huyện)**

Tính giá trị biểu thức $\frac{2^{12}.13+2^{12}.65}{2^{10}.104}+\frac{3^{10}.11+3^{10}.5}{3^9.2^4}$

Lời giải

$\frac{2^{12}.13+2^{12}.65}{2^{10}.104}+\frac{3^{10}.11+3^{10}.5}{3^9.2^4}=\frac{2^{12}.78}{2^{10}.104}+\frac{3^{10}.16}{3^9.16}=3+3=6$

$\Rightarrow$ B= $\frac{2}{3}(\frac{1}{1}-\frac{1}{100})=\frac{2}{3}.\frac{99}{100}=\frac{33}{50}$

Câu 6. **(Đề thi HSG 6 huyện)**

Thực hiện phép tính bằng cách hợp lí :

A = $\frac{636363.37-373737.63}{1+2+3+....+2006}$.

B = $1\frac{6}{41}.\left(\frac{12+\frac{12}{19}-\frac{12}{37}-\frac{12}{53}}{3+\frac{1}{3}-\frac{3}{37}-\frac{3}{53}}:\frac{4+\frac{4}{17}+\frac{4}{19}+\frac{4}{2006}}{5+\frac{5}{17}+\frac{5}{19}+\frac{5}{2006}}\right).\frac{124242423}{237373735}$.

Lời giải

A = $\frac{636363.37-373737.63}{1+2+3+....+2006}=\frac{63.(10101.37)-37.(10101.63)}{1+2+3+....+2006}$

$=\frac{37.63.(10101-10101)}{1+2+3+....+2006}=0$

$$B = 1\frac{6}{41}.\left(\frac{12+\frac{12}{19}-\frac{12}{37}-\frac{12}{53}}{3+\frac{1}{3}-\frac{3}{37}-\frac{3}{53}}:\frac{4+\frac{4}{17}+\frac{4}{19}+\frac{4}{2006}}{5+\frac{5}{17}+\frac{5}{19}+\frac{5}{2006}}\right).\frac{124242423}{237373735}$$

$$=\frac{47}{41}.\left(\frac{12.\left(1+\frac{1}{19}-\frac{1}{37}-\frac{1}{53}\right)}{3\left(1+\frac{1}{19}-\frac{1}{37}-\frac{1}{53}\right)}:\frac{4\left(1+\frac{1}{17}+\frac{1}{19}+\frac{1}{2006}\right)}{5\left(1-\frac{1}{17}-\frac{1}{19}+\frac{1}{2006}\right)}\right).\frac{41.3.1010101}{47.5.1010101}$$

$$= \frac{47}{41}.(4.\frac{5}{4}).\frac{41.3}{47.5} = 3.$$

Câu 7. **(Đề thi HSG 6 huyện)**

Tính: C = $\frac{101+100+99+98+...+3+2+1}{101-100+99-98+...+3-2+1}$;

D = $\frac{3737.43-4343.37}{2+4+6+...+100}$.

Lời giải

C = $\frac{101+100+99+98+...+3+2+1}{101-100+99-98+...+3-2+1}$

Ta có:

*) 101 + (100 + 99 + ... + 3 + 2 + 1)

=101 + 101.100 : 2 = 101 + 5050 = 5151

*) 101 - 100 + 99 - 98 + ... + 3 - + 1

= $\underbrace{(101 - 100) + (99 - 98) + ... + (3 - 2)}_{50 \text{ cap}}$ + 1 = 50 + 1 = 51

Vậy C = $\frac{5151}{51} = 101$.

b) B = $\frac{3737.43-4343.37}{2+4+6+...+100}$

Ta có: 3737.43 - 4343.37 = 34.43.101 - 43.101.37 = 0

Vậy B = 0 (vì 2 = 4 + 6 + ...+ 100 ≠ 0).

Câu 8. **(Đề thi HSG 6 huyện)**

Tính tổng S = $\frac{27+4500+135+550.2}{2+4+6+....14+16+18}$.

Lời giải

S = $\frac{270.450+270.550}{\frac{(2+18).9}{2}} = \frac{270(450+550)}{90} = \frac{270000}{90} = 3000$

Câu 9. **(Đề thi HSG 6 huyện)**

Tính các giá trị của biểu thức.

a) S = 1+2+3+4+.....+100.

b) B = $-1\frac{1}{5}.\frac{4(3+\frac{1}{3}-\frac{3}{7}-\frac{3}{53})}{3+\frac{1}{3}-\frac{3}{37}-\frac{3}{53}}:\frac{4+\frac{4}{17}+\frac{4}{19}+\frac{4}{2003}}{5+\frac{5}{17}+\frac{5}{19}+\frac{5}{2003}}$.

c) C = $\frac{1}{1.2}+\frac{1}{2.3}+\frac{1}{3.4}+\frac{1}{4.5}+...+\frac{1}{99.100}$.

Lời giải

a) Tổng : S =1 +2 +3 +...+100 có 100 số hạng .
= (1+ 100) + (2 +99) + (3 + 98) + ... + 950 + 51) có 50 cặp .
= 50 . 10 = 5050.

b) A = $-1\frac{1}{5}.\frac{4(3+\frac{1}{3}-\frac{3}{37}-\frac{3}{53})}{(3+\frac{1}{3}-\frac{3}{37}-\frac{3}{53})}:\frac{4+\frac{4}{17}+\frac{4}{19}+\frac{4}{2003}}{5+\frac{5}{17}+\frac{5}{19}+\frac{5}{2003}}$

Ta có : A = - $\frac{6}{5}.\frac{4}{1}:\frac{4(1+\frac{1}{17}+\frac{1}{19}+\frac{1}{2003})}{5(1+\frac{1}{17}+\frac{1}{19}+\frac{1}{2003})}$ = - $\frac{6}{5}.\frac{4}{1}:\frac{4}{5}=-\frac{6}{5}.\frac{4.5}{4}=-6.$

c) B = $\frac{1}{2.3}$ + $\frac{1}{3.4}$ + $\frac{1}{4.5}$ + $\frac{1}{5.6}$ +.....+ $\frac{1}{99.100}$

Ta có : B = 1 - $\frac{1}{2}$ + $\frac{1}{2}$ - $\frac{1}{3}$ + $\frac{1}{3}$ - $\frac{1}{4}$ +.....+ $\frac{1}{99}$ - $\frac{1}{100}$ = 1 - $\frac{1}{100}$ = $\frac{99}{100}$.

Câu 10. (Đề thi HSG 6 huyện)

Tính tổng $A=\frac{1}{3}+\frac{1}{3^2}+\frac{1}{3^3}+...+\frac{1}{3^{100}}$

Lời giải

Ta có $A=\frac{1}{3}+\frac{1}{3^2}+\frac{1}{3^3}+...+\frac{1}{3^{100}}$

$3A=1+\frac{1}{3}+\frac{1}{3^2}+\frac{1}{3^3}+...+\frac{1}{3^{99}}$

$\Rightarrow 3A-A=(1+\frac{1}{3}+\frac{1}{3^2}+\frac{1}{3^3}+...+\frac{1}{3^{99}})-(\frac{1}{3}+\frac{1}{3^2}+\frac{1}{3^3}+...+\frac{1}{3^{100}})$

$\Rightarrow 2A=1-\frac{1}{3^{100}}=\frac{3^{100}-1}{3^{100}}$

Vậy $A=\frac{3^{100}-1}{2.3^{100}}$.

Câu 11. (Đề thi HSG 6 huyện)

Tính:

A= $\frac{5}{11.16}+\frac{5}{16.21}+\frac{5}{21.26}+...+\frac{5}{61.66}$.

B= $\frac{1}{2}+\frac{1}{6}+\frac{1}{12}+\frac{1}{20}+\frac{1}{30}+\frac{1}{42}$.

C = $\frac{1}{1.2}+\frac{1}{2.3}+...+\frac{1}{1989.1990}+...+\frac{1}{2006.2007}$.

Lời giải

A= $\frac{1}{11}-\frac{1}{16}+\frac{1}{16}-\frac{1}{21}+\frac{1}{21}-\frac{1}{26}+...+\frac{1}{61}-\frac{1}{66}=\frac{1}{11}-\frac{1}{66}=\frac{5}{66}$.

B= $1-\frac{1}{2}+\frac{1}{2}-\frac{1}{3}+\frac{1}{3}-\frac{1}{4}+\frac{1}{4}-\frac{1}{5}+\frac{1}{5}-\frac{1}{6}+\frac{1}{6}-\frac{1}{7}=1-\frac{1}{7}=\frac{6}{7}$.

C = $1-\frac{1}{2}+\frac{1}{2}-\frac{1}{3}+...+\frac{1}{1989}-\frac{1}{1990}+...+\frac{1}{2006}-\frac{1}{2007}=1-\frac{1}{2007}=\frac{2006}{2007}$.

Câu 12. (Đề thi HSG 6)

Tính tổng sau bằng cách hợp lý nhất:

A = 11 + 12 + 13 + 14 + …..+ 20.

B = 11 + 13 + 15 + 17 + …..+ 25.

C = 12 + 14 + 16 + 18 + …..+ 26.

Lời giải

A = (11 + 20) + (12 + 19) + (13 + 18) + (14 + 17) + (15+ 16)

= 31 + 31 + 31 +31+ 31 = 31.5= 155

B = (11+25)+(13+23)+(15 + 21)+(17 +19) = 36.4 = 144.

C = (12 +26)+(14+24)+(16 +22)+(18 +20) = 38.4 = 152.

Câu 13. (Đề thi HSG 6 huyện)

Tính tổng: M = $\frac{10}{56}+\frac{10}{140}+\frac{10}{260}+....+\frac{10}{1400}$

Lời giải

M = $\frac{10}{56}+\frac{10}{140}+\frac{10}{260}+...+\frac{10}{1400}=\frac{5}{4.7}+\frac{5}{7.10}+\frac{5}{10.13}+...+\frac{5}{25.28}$

$=\frac{5}{3}.\left(\frac{1}{4}-\frac{1}{7}+\frac{1}{7}-\frac{1}{10}+\frac{1}{10}-\frac{1}{13}+...+\frac{1}{25}-\frac{1}{28}\right)$

$=\frac{5}{3}.\frac{6}{28}=\frac{5}{14}$.

Câu 14. (Đề thi HSG 6 huyện)

Tính giá trị biểu thức: $\frac{2^{12}.13+2^{12}.65}{2^{10}.104}+\frac{3^{10}.11+3^{10}.5}{3^9.2^4}$

Lời giải

$\frac{2^{12}.13+2^{12}.65}{2^{10}.104}+\frac{3^{10}.11+3^{10}.5}{3^9.2^4}=3+3=6$

Câu 15. (Đề thi HSG 6 huyện)

Tính tỷ số $\frac{A}{B}$

A= $\frac{40}{3139}+\frac{35}{3916}+\frac{30}{2392}+\frac{25}{2964}$; B = $\frac{91}{1931}+\frac{65}{1943}+\frac{39}{989}+\frac{143}{131}$.

Lời giải

A = $\frac{40}{31.39}+\frac{35}{39.46}+\frac{30}{46.52}+\frac{25}{52.57}$

$=\frac{40}{8}\left(\frac{1}{31}-\frac{1}{39}\right)+\frac{35}{7}\left(\frac{1}{39}-\frac{1}{46}\right)+\frac{30}{6}\left(\frac{1}{46}-\frac{1}{52}\right)+\frac{25}{5}\left(\frac{1}{52}-\frac{1}{57}\right)$

$=5\left(\frac{1}{31}-\frac{1}{57}\right)=\frac{5.26}{31.57}$

B = $\frac{91}{19.31}+\frac{65}{19.43}+\frac{39}{23.43}+\frac{143}{69.19}$

$=\frac{13}{19}\left(\frac{7}{31}+\frac{5}{43}\right)+\frac{13}{23}\left(\frac{3}{43}+\frac{11}{57}\right)=13\left(\frac{24}{31.19}+\frac{28}{43.57}\right)=\frac{13.52}{57} \Rightarrow \frac{A}{B}=\frac{5.26}{31.57}:\frac{13.52}{57}=\frac{5}{62}$.

Câu 16. **(Đề thi HSG 6 huyện)**

Cho $A=\frac{34}{7.13}+\frac{51}{13.22}+\frac{85}{22.37}+\frac{68}{37.49}$, $B=\frac{39}{7.16}+\frac{65}{16.31}+\frac{52}{31.43}+\frac{26}{43.49}$

Tính tỷ số $\frac{A}{B}$.

Lời giải

Ta có:

$A=\frac{34}{7.13}+\frac{51}{13.22}+\frac{85}{22.37}+\frac{68}{37.49}=\frac{34}{6}\left(\frac{1}{7}-\frac{1}{13}\right)+.....+\frac{68}{12}\left(\frac{1}{37}-\frac{1}{49}\right)=\frac{17}{3}\left(\frac{1}{7}-\frac{1}{49}\right)$

$B=\frac{39}{7.16}+\frac{65}{16.31}+\frac{52}{31.43}+\frac{26}{43.49}=\frac{39}{9}\left(\frac{1}{7}-\frac{1}{16}\right)+.....+\frac{26}{6}\left(\frac{1}{43}-\frac{1}{49}\right)=\frac{13}{3}\left(\frac{1}{7}-\frac{1}{49}\right) \Rightarrow \frac{A}{B}=\frac{34}{49}:\frac{26}{49}=\frac{17}{3}$.

Câu 17. **(Đề thi HSG 6 huyện)**

Thực hiện dãy tính: $\frac{13.4^6.\left(28\frac{7}{13}-27\frac{5}{18}\right)}{59.2^{12}\left(\frac{5}{14}+\frac{5}{84}+\frac{5}{204}+\frac{5}{374}\right)}$.

Lời giải

Ta có: $A=\frac{13.4^6.\frac{295}{13.18}}{59.2^{12}.5.\left(\frac{1}{2.7}+\frac{1}{2.3.7}+\frac{1}{2.3.17}+\frac{1}{2.11.17}\right)}=\frac{2^{12}.295}{59.5.2^{12}.18}.\frac{2.11.17}{5.7}=\frac{187}{315}$.

Câu 18. **(Đề thi HSG 6 huyện)**

Tính $\frac{21}{54}+\frac{3}{75}:\frac{\left(\frac{39}{65}+0,415-\frac{33}{600}\right):\frac{21}{9}}{7^2-18,25+13\frac{15}{36}-16\frac{17}{102}}$

Lời giải

Ta có: $\frac{21}{54}+\frac{3}{75}:\frac{0,96.\frac{7}{3}}{30\frac{9}{12}+13\frac{5}{12}-16\frac{1}{6}}=\frac{21}{54}+\frac{3}{75}:\frac{2,24}{28}=\frac{8}{9}$.

Câu 19. **(Đề thi HSG 6 huyện)**

Tính

a) A = $\dfrac{101+100+99+98+\ldots+3+2+1}{101-100+99-98+\ldots+3-2+1}$

b) B = $\dfrac{423134\,.\,846267-423133}{423133\,.\,846267+423134}$.

Lời giải

a) A = $\dfrac{101\,.\,51}{51}=101$

b) B = $\dfrac{423133\,.\,846267+846267-423133}{423133\,.\,846267+423134}=1$

Câu 20. (Đề thi HSG 6 huyện)

Tính nhanh:

a) A = $\dfrac{24.47-23}{24+47-23}.\dfrac{3+\frac{3}{7}-\frac{3}{11}+\frac{3}{1001}-\frac{3}{13}}{\frac{9}{1001}-\frac{9}{13}+\frac{9}{7}-\frac{9}{11}+9}$

b) B = $(-329)+(-15)+(-101)+440+2019$

c) $M=\dfrac{1+2+2^2+2^3+\ldots+2^{2012}}{2^{2014}-2}$

Lời giải

a) Đặt $A=E.F$

E = $\dfrac{24.47-23}{24+47-23}=\dfrac{1128-23}{71-23}=\dfrac{1105}{48}$

F = $\dfrac{3\left(1+\frac{1}{7}-\frac{1}{11}+\frac{1}{1001}-\frac{1}{13}\right)}{9\left(\frac{1}{1001}-\frac{1}{13}+\frac{1}{7}-\frac{1}{11}+1\right)}=\dfrac{1}{3}$.

Suy ra A = $\dfrac{1105}{144}$.

b) $B=(-329)+(-15)+(-101)+440+2019$

$B=(-329-101-10)+440+(2019-5)$

$B=(-440)+440+2014=2014$

c) $M=\dfrac{1+2+2^2+2^3+\ldots+2^{2012}}{2^{2014}-2}$

- Đặt $A=1+2+2^2+2^3+\ldots+2^{2012}$

- Tính được $A = 2^{2013} - 1$

- Đặt $B = 2^{2014} - 2$

- Tính được $B = 2\ 2^{2013} - 1$

- Tính được $M = \frac{1}{2}$.

Câu 21. (Đề thi HSG 6 huyện Nghĩa Đàn 2012-2013)

Thực hiện phép tính một cách hợp lý:

a) $A = \frac{2}{3}.\frac{2013}{2012} - \frac{2}{3}.\frac{1}{2012} + \frac{1}{3}$

b) $B = \left(\frac{12}{199} + \frac{23}{200} - \frac{34}{201}\right)\left(\frac{1}{2} - \frac{1}{3} - \frac{1}{6}\right)$

c) $C = 1500 - \left\{5^3.2^3 - 11\left[7^2 - 5.2^3 + 8\left(11^2 - 121\right)\right]\right\}$

Lời giải

a) $A = \frac{2}{3}\left(\frac{2013}{2012} - \frac{1}{2012}\right) + \frac{1}{3} = \frac{2}{3}.\frac{2013-1}{2012} + \frac{1}{3} = \frac{2}{3} + \frac{1}{3} = 1$

b) $B = \left(\frac{12}{199} + \frac{23}{200} - \frac{34}{201}\right)\left(\frac{3}{6} - \frac{2}{6} - \frac{1}{6}\right)$

$= \left(\frac{12}{199} + \frac{23}{200} - \frac{34}{201}\right)\left(\frac{3}{6} - \frac{3}{6}\right) = \left(\frac{12}{199} + \frac{23}{200} - \frac{34}{201}\right).0 = 0$

Vậy $B = 0$.

c) $C = 1500 - \left\{5^3.2^3 - 11\left[7^2 - 5.2^3 + 8\left(11^2 - 121\right)\right]\right\}$

$= 1500 - \left\{125.8 - 11\left[49 - 5.8 + 8\left(121 - 121\right)\right]\right\}$

$= 1500 - \left\{125.8 - 11\left[49 - 40 + 8.0\right]\right\} = 1500 - \left\{1000 - 11.9\right\} = 599$

Câu 22. (Đề thi HSG 6 huyện năm 2006 - 2007)

Rút gọn biểu thức: $A = \frac{\frac{2}{7} + \frac{2}{5} + \frac{2}{17} - \frac{2}{293}}{\frac{3}{7} + \frac{3}{5} + \frac{3}{17} - \frac{3}{293}}$.

Lời giải

$A = \frac{\frac{2}{7} + \frac{2}{5} + \frac{2}{17} - \frac{2}{293}}{\frac{3}{7} + \frac{3}{5} + \frac{3}{17} - \frac{3}{293}} = \frac{2\left(\frac{1}{7} + \frac{1}{5} + \frac{1}{17} - \frac{1}{293}\right)}{3\left(\frac{1}{7} + \frac{1}{5} + \frac{1}{17} - \frac{1}{293}\right)} = \frac{2}{3}$

Câu 23. **(Đề thi HSG 6 huyện 2013 - 2014)**

Thực hiện phép tính bằng cách hợp lí :

a) $-2013\ .2014+1007.26$

b) $\left(\frac{1313}{1414}+\frac{10}{160}\right)-\left(\frac{130}{140}-\frac{1515}{1616}\right)$

Lời giải

a) $(-2013).2014+2014.13=2014(-2013+13)=2014.(-2000)=-4028000$

b) $\left(\frac{1313}{1414}+\frac{10}{160}\right)-\left(\frac{130}{140}-\frac{1515}{1616}\right)=\frac{13}{14}+\frac{1}{16}-\frac{13}{14}+\frac{15}{16}$

$=\frac{13}{14}-\frac{13}{14}+\frac{1}{16}+\frac{15}{16}=0+\frac{16}{16}=0+1=1$

Câu 24. **(Đề thi HSG 6 huyện)**

Tính $A=\frac{1}{10}+\frac{1}{40}+\frac{1}{88}+\frac{1}{154}+\frac{1}{238}+\frac{1}{340}$.

Lời giải

$3A=\frac{3}{2.5}+\frac{3}{5.8}+\frac{3}{8.11}+\frac{3}{11.14}+\frac{3}{14.17}+\frac{3}{17.20}$

$=\frac{1}{2}-\frac{1}{5}+\frac{1}{5}-\frac{1}{8}+\frac{1}{8}-\frac{1}{11}+\frac{1}{11}-\frac{1}{14}+\frac{1}{14}-\frac{1}{17}+\frac{1}{17}-\frac{1}{20}$

$=\frac{1}{2}-\frac{1}{20}=\frac{9}{20}$

Suy ra $A=\frac{3}{20}$.

Câu 25. **(Đề thi HSG 6 huyện 2013 - 2014)**

Tính giá trị của các biểu thức sau:

a) $2\left[\left(6^2-24\right):4\right]+2014$

b) $\left(1+2\frac{1}{3}-3\frac{1}{4}\right):\left(1+3\frac{7}{12}-4\frac{1}{2}\right)$

Giải

a) $2\left[\left(6^2-24\right):4\right]+2014=2\left[(36-24):4\right]+2014$

$=2.[12:4]+2014=2.3+2014=6+2014=2020$

b) $\left(1+2\frac{1}{3}-3\frac{1}{4}\right):\left(1+3\frac{7}{12}-4\frac{1}{2}\right)=\left(\frac{1}{3}-\frac{1}{4}\right):\left(\frac{7}{12}-\frac{1}{2}\right)=\frac{1}{12}:\frac{1}{12}=1$.

Câu 26. (Đề thi HSG 6 huyện)

Các phân số sau có bằng nhau không? Vì sao?

$$\frac{23}{99};\frac{23232323}{99999999};\frac{2323}{9999};\frac{232323}{999999}$$

Lời giải

Ta thấy: $\frac{23}{99}=\frac{23.101}{99.101}=\frac{2323}{9999}$

$\frac{23}{99}=\frac{23.10101}{99.10101}=\frac{232323}{999999}$

$\frac{23}{99}=\frac{23.1010101}{99.1010101}=\frac{23232323}{99999999}$

Vậy: $\frac{23}{99}=\frac{2323}{9999}=\frac{232323}{999999}=\frac{232323}{999999}$

Câu 27. (Đề thi HSG 6 huyện)

Tính giá trị của biểu thức sau:

$$A=\left(\frac{1}{7}+\frac{1}{23}-\frac{1}{1009}\right):\left(\frac{1}{23}+\frac{1}{7}-\frac{1}{1009}+\frac{1}{7}.\frac{1}{23}.\frac{1}{1009}\right)+1:\left(30.1009-160\right)$$

Lời giải

Ta viết lại A như sau :

$$A=\frac{\left(\frac{1}{23}+\frac{1}{7}-\frac{1}{1009}\right).23.7.1009}{\left(\frac{1}{23}+\frac{1}{7}-\frac{1}{1009}+\frac{1}{23}.\frac{1}{7}.\frac{1}{1009}\right).23.7.1009}+\frac{1}{\left(23+7\right).1009-161+1}$$

$$=\frac{7.1009+23.1009-23.7}{7.1009+23.1009-23.7+1}+\frac{1}{23.1009+7.1009-23.7+1}=1$$

Câu 28. (Đề thi HSG 6 huyện)

Tính nhanh:

a) $35.34+35.86+65.75+65.45$

b) $21.7^2-11.7^2+90.7^2+49.125.16$

Lời giải

a) $35.34+35.86+65.75+65.45$

$=35.\left(34+86\right)+65.\left(75+45\right)$

$=35.120+65.120$

$=120.\left(35+65\right)=120.100=12000$

b) $21.7^2-11.7^2+90.7^2+49.125.16$

$=21.7^2-11.7^2+90.7^2+7^2.125.8.2$

$=7^2.\left(21-11+90+125.8.2\right)$

$=7^2.\left(100+1000.2\right)$

$=7^2.2100=49.2100=102900$

Câu 29. (Đề thi HSG 6 huyện)

Thực hiện các phép tính sau:

a) $\frac{2181.729+243.81.27}{3^2.9^2.234+18.54.162.9+723.729}$

b) $\frac{1}{1.2}+\frac{1}{2.3}+\frac{1}{3.4}+\cdots+\frac{1}{98.99}+\frac{1}{99.100}$

c) $\frac{1}{2^2}+\frac{1}{3^2}+\frac{1}{4^2}+\cdots+\frac{1}{100^2}<1$

d) $\frac{5.4^{15}-9^9-4.3^{20}.8^9}{5.2^9.6^{19}-7.2^{29}.27^6}$

Lời giải

a) $\frac{2181.729+243.3-81.9}{3^2.9^2\ .243+9^3.2.6.162+723.729}=\frac{2181.729+729^2}{729.243+729.1944+723.729}$

$=\frac{729(2181+729)}{729(243+1944+723)}=\frac{729.2910}{729.2910}=1$

b) Ta có:

$\frac{1}{1.2}=\frac{1}{1}-\frac{1}{2};\ \frac{1}{2.3}=\frac{1}{2}-\frac{1}{3};\ \frac{1}{3.4}=\frac{1}{3}-\frac{1}{4};\ \frac{1}{99.100}=\frac{1}{99}-\frac{1}{100}$

Vậy $\frac{1}{1.2}+\frac{1}{2.3}+\frac{1}{3.4}+\cdots+\frac{1}{98.99}+\frac{1}{99.100}=\frac{1}{1}-\frac{1}{2}+\frac{1}{2}-\frac{1}{3}+\frac{1}{3}-\frac{1}{4}+\cdots+\frac{1}{98}-\frac{1}{99}+\frac{1}{99}-\frac{1}{100}$

$=1-\frac{1}{100}=\frac{99}{100}$.

c) Ta có:

$\frac{1}{2^2}<\frac{1}{1.2}=\frac{1}{1}-\frac{1}{2};\quad \frac{1}{3^2}<\frac{1}{2.3}=\frac{1}{2}-\frac{1}{3};\quad \frac{1}{4^2}<\frac{1}{3.4}=\frac{1}{3}-\frac{1}{4};...;\frac{1}{100^2}<\frac{1}{99.100}=\frac{1}{99}-\frac{1}{100}$

Vậy $\frac{1}{2^2}+\frac{1}{3^2}+\frac{1}{4^2}+\cdots+\frac{1}{10\ 0^2}<\frac{1}{1.2}+\frac{1}{2.3}+\frac{1}{3.4}+\cdots+\frac{1}{99.100}=$

$=1-\frac{1}{2}+\frac{1}{2}-\frac{1}{3}+\frac{1}{3}-\frac{1}{4}+\cdots+\frac{1}{99}-\frac{1}{100}\quad =1-\frac{1}{2}=\frac{99}{100}<1.$

d) $\frac{5.2^{30}.3^{18}-2^2.3^{20}.2^{27}}{5\ .2^9.2^{19}.3^{19}-7.2^{29}.3^{18}}=\frac{2^{29}.3^{18}(5.2-3)}{2^{28}.3^{18}(5.3-7.2)}=2$

Câu 30. (Đề thi HSG 6 huyện)

Tính nhanh:

A = $\frac{1.5.6+2.10.12+4.20.24+9.45.54}{1.3.5+2.6.10+4.12.20+9.27.45}$

Lời giải

A= $\frac{1.5.6+2.10.12+4.20.24+9.45.54}{1.3.5+2.6.10+4.12.20+9.27.45}$ = $\frac{1.5.6\left(1+2.2.2+4.4.4+9.9.9\right)}{1.3.5\left(1+2.2.2+4.4.4+9.9.9\right)}=\frac{1.5.6}{1.3.5}=2$.

Câu 31. (Đề thi HSG 6 huyện)

Tính các tổng sau một cách hợp lí.

a) $1+\ 6+\ 11+\ 16+\ ...+\ 46+\ 51$

b) $\frac{5^2}{1.6}+\frac{5^2}{6.11}+\frac{5^2}{11.16}+\frac{5^2}{16.21}+\frac{5^2}{21.26}+\frac{5^2}{26.31}$

Lời giải

a) Dãy trên có số các số hạng là:

$(51-1):5+1=11$ (số hạng)

Vậy tổng $1+\ 6+\ 11+\ 16+\ ...+\ 46+\ 51=(51+1).11:2=286$

b) Ta có:

$\frac{5^2}{1.6}+\frac{5^2}{6.11}+\frac{5^2}{11.16}+\frac{5^2}{16.21}+\frac{5^2}{21.26}+\frac{5^2}{26.31}$

$=5.\left(\frac{5}{1.6}+\frac{5}{6.11}+\frac{5}{11.16}+\frac{5}{16.21}+\frac{5}{21.26}+\frac{5}{26.31}\right)$

$=5.\left(1-\frac{1}{6}+\frac{1}{6}-\frac{1}{11}+\frac{1}{11}-\frac{1}{16}+\frac{1}{16}-\frac{1}{21}+\frac{1}{21}-\frac{1}{26}+\frac{1}{26}-\frac{1}{31}\right)$

$=5.\left(1-\frac{1}{31}\right)$

$=5.\frac{30}{31}=\frac{150}{31}$

Câu 32. (Đề thi HSG 6 huyện)

Tính tổng S = 1.2 + 2.3 + 3.4 + ... + 99.100

Lời giải

$S\ =1.2\ +\ 2.3\ +\ 3.4\ +\ ...\ +\ 99.100$

$3.S=(1.2\ +\ 2.3\ +\ 3.4\ +\ ...\ +\ 99.100).3$

$3.S=1.2.3\ +\ 2.3.3\ +\ 3.4.3\ +\ ...\ +\ 99.100.3$

$3.S=1.2.3\ +2.3.(4\ -\ 1)\ +\ 3.4.(5\ -\ 2)\ +\ ...\ +\ 99.100.(101\ -\ 98)$

$3.S=1.2.3\ -\ 1.2.3\ +\ 2.3.4\ -\ 2.3.4\ +\ 3.4.5\ -\ ...\ -\ 98.99.100\ +\ 99.100.101$

$S=99.100.101:\ 3\ =\ 33.\ 100\ .\ 101\ =\ 333300$

Câu 33. (Đề thi HSG 6 huyện)

Thực hiện phép tính bằng cách hợp lí :

1) $A=\frac{636363.37-373737.63}{1+2+3+....+2006}$

2) $B=1\frac{6}{41}.\left(\frac{12+\frac{12}{19}-\frac{12}{37}-\frac{12}{53}}{3+\frac{1}{3}-\frac{3}{37}-\frac{3}{53}}:\frac{4+\frac{4}{17}+\frac{4}{19}+\frac{4}{2006}}{5+\frac{5}{17}+\frac{5}{19}+\frac{5}{2006}}\right).\frac{124242423}{237373735}$

Lời giải

1) A = $\frac{636363.37-373737.63}{1+2+3+....+2006}$

$= \dfrac{63.(10101.37)-37.(10101.63)}{1+2+3+....+2006} = \dfrac{37.63.(10101-10101)}{1+2+3+....+2006} = 0$

2) $B = 1\dfrac{6}{41}.\left(\dfrac{12+\dfrac{12}{19}-\dfrac{12}{37}-\dfrac{12}{53}}{3+\dfrac{1}{3}-\dfrac{3}{37}-\dfrac{3}{53}} : \dfrac{4+\dfrac{4}{17}+\dfrac{4}{19}+\dfrac{4}{2006}}{5+\dfrac{5}{17}+\dfrac{5}{19}+\dfrac{5}{2006}}\right).\dfrac{124242423}{237373735}$

$= \dfrac{47}{41}.\left(\dfrac{12.\left(1+\dfrac{1}{19}-\dfrac{1}{37}-\dfrac{1}{53}\right)}{3\left(1+\dfrac{1}{19}-\dfrac{1}{37}-\dfrac{1}{53}\right)} : \dfrac{4\left(1+\dfrac{1}{17}+\dfrac{1}{19}+\dfrac{1}{2006}\right)}{5\left(1-\dfrac{1}{17}-\dfrac{1}{19}+\dfrac{1}{2006}\right)}\right).\dfrac{41.3.1010101}{47.5.1010101}$

$= \dfrac{47}{41}.(4.\dfrac{5}{4}).\dfrac{41.3}{47.5} = 3$

Câu 34. (Đề thi HSG 6 huyện)

Tìm kết quả của phép nhân

$A = \underbrace{333.....3}_{50\,chu\,so} \times \underbrace{999...9}_{50\,chu\,so}$

Lời giải

$A = \underbrace{333...3}_{50\text{ chu so}} \text{ x } \left(\underbrace{100..0}_{50\text{ chu so}} - 1\right) = \underbrace{33...300...0}_{50\text{ chu so }50\text{ chu so}} - \underbrace{33...3}_{50\text{ chu so}}$

$= \begin{array}{r} 33\ldots33\,00\ldots00 \\ -\ 33\ldots33 \\ \hline \end{array}$

$\underbrace{33\ldots32}_{49\text{ chu so}}\ \underbrace{66\ldots67}_{49\text{ chu so}}$

Vậy $A = \underbrace{33\ldots32}_{49\text{ chu so}}\underbrace{66\ldots67}_{49\text{ chu so}}$

Câu 35. (Đề thi HSG 6 huyện)

Tính giá trị của biểu thức.

$B = -1\dfrac{1}{5}.\dfrac{4(3+\dfrac{1}{3}-\dfrac{3}{7}-\dfrac{3}{53})}{3+\dfrac{1}{3}-\dfrac{3}{37}-\dfrac{3}{53}} : \dfrac{4+\dfrac{4}{17}+\dfrac{4}{19}+\dfrac{4}{2003}}{5+\dfrac{5}{17}+\dfrac{5}{19}+\dfrac{5}{2003}}.$

Lời giải

$B = -1\dfrac{1}{5}.\dfrac{4(3+\dfrac{1}{3}-\dfrac{3}{37}-\dfrac{3}{53})}{(3+\dfrac{1}{3}-\dfrac{3}{37}-\dfrac{3}{53})} : \dfrac{4+\dfrac{4}{17}+\dfrac{4}{19}+\dfrac{4}{2003}}{5+\dfrac{5}{17}+\dfrac{5}{19}+\dfrac{5}{2003}}$

Ta có : $B = -\dfrac{6}{5}.\dfrac{4}{1} : \dfrac{4(1+\dfrac{1}{17}+\dfrac{1}{19}+\dfrac{1}{2003})}{5(1+\dfrac{1}{17}+\dfrac{1}{19}+\dfrac{1}{2003})} = -\dfrac{6}{5}.\dfrac{4}{1} : \dfrac{4}{5} = -\dfrac{6}{5}.\dfrac{4.5}{4} = -6$

Câu 36. (Đề thi HSG 6 huyện Trực Ninh 2017 - 2018)

Tính hợp lý

a) $A=2018^2-2017.2018\sqrt{a^2+b^2}$

b) $B=(-1).(-1)^2.(-1)^3.(-1)^4.....(-1)^{99}.(-1)^{100}$

c) $C=\dfrac{88-\dfrac{1}{6}-\dfrac{2}{7}-\dfrac{3}{8}-.....-\dfrac{88}{93}}{-\dfrac{1}{12}-\dfrac{1}{14}-\dfrac{1}{16}-.....-\dfrac{1}{186}}$

Lời giải

a) $A=2018.(2018-2017)=2018.1=2018$

b) $B=(-1).1.(-1).1.....(-1).1$ (Có 50 thừa số -1) nên B= 1

c) $C=\dfrac{\left(1-\dfrac{1}{6}\right)+\left(1-\dfrac{2}{7}\right)+\left(1-\dfrac{3}{8}\right)+.....+\left(1-\dfrac{88}{93}\right)}{-\dfrac{1}{12}-\dfrac{1}{14}-\dfrac{1}{16}.....-\dfrac{1}{186}}$

$C=\dfrac{\dfrac{5}{6}+\dfrac{5}{7}+\dfrac{5}{8}+.....+\dfrac{5}{93}}{-\dfrac{1}{12}-\dfrac{1}{14}-\dfrac{1}{16}.....-\dfrac{1}{186}}=\dfrac{5.\left(\dfrac{1}{6}+\dfrac{1}{7}+\dfrac{1}{8}+.....+\dfrac{1}{93}\right)}{-\dfrac{1}{2}.\left(\dfrac{1}{6}+\dfrac{1}{7}+\dfrac{1}{8}+.....+\dfrac{1}{93}\right)}$

$C=-10$

Câu 37. (Đề thi HSG 6 huyện Nga Sơn 2017 - 2018)

Thực hiện phép tính bằng cách hợp lý:

a) $(-2013).2014+1007.26$

b) $\left(\dfrac{1313}{1414}+\dfrac{10}{160}\right)-\left(\dfrac{130}{140}-\dfrac{1515}{1616}\right)$

Lời giải

a) $(-2013).2014+1007.26=(-2013).2014+2014.13$

$=2014.(-2013+13)=2014.(-2000)=-4028000$

b) $\left(\dfrac{1313}{1414}+\dfrac{10}{160}\right)-\left(\dfrac{130}{140}-\dfrac{1515}{1616}\right)=\left(\dfrac{13}{14}+\dfrac{1}{16}\right)-\left(\dfrac{13}{14}-\dfrac{15}{16}\right)$

$=\left(\dfrac{13}{14}-\dfrac{13}{14}\right)+\left(\dfrac{15}{16}+\dfrac{1}{16}\right)=1$

Câu 38. (Đề thi HSG 6 huyện Kinh Môn 2017 - 2018)

Rút gọn biểu thức $A=\left(1+\dfrac{1}{3}\right).\left(1+\dfrac{1}{8}\right).\left(1+\dfrac{1}{15}\right).....\left(1+\dfrac{1}{2499}\right)$

Tính nhanh $B=\dfrac{1+\dfrac{1}{3}+\dfrac{1}{9}+\dfrac{1}{27}}{2+\dfrac{2}{3}+\dfrac{2}{9}+\dfrac{2}{27}}:\dfrac{4+\dfrac{4}{7}+\dfrac{4}{49}-\dfrac{4}{343}}{1+\dfrac{1}{7}+\dfrac{1}{49}-\dfrac{1}{343}}$

Lời giải

a) $A=\left(1+\dfrac{1}{3}\right).\left(1+\dfrac{1}{8}\right).\left(1+\dfrac{1}{15}\right).....\left(1+\dfrac{1}{2499}\right)$

$A=\dfrac{4}{3}.\dfrac{9}{8}.\dfrac{16}{15}.....\dfrac{2500}{2499}=\dfrac{2.2}{1.3}.\dfrac{3.3}{2.4}.\dfrac{4.4}{3.5}.....\dfrac{50.50}{49.51}$

$=\dfrac{2.3.4.....50}{1.2.3.....49}.\dfrac{2.3.4.....50}{3.4.5.....51}=\dfrac{50}{1}.\dfrac{2}{51}=\dfrac{100}{51}$

Vậy $A=\dfrac{100}{51}$

b) $B=\dfrac{1+\dfrac{1}{3}+\dfrac{1}{9}+\dfrac{1}{27}}{2+\dfrac{2}{3}+\dfrac{2}{9}+\dfrac{2}{27}}:\dfrac{4+\dfrac{4}{7}+\dfrac{4}{49}-\dfrac{4}{343}}{1+\dfrac{1}{7}+\dfrac{1}{49}-\dfrac{1}{343}}$

$B=\dfrac{1.\left(1+\dfrac{1}{3}+\dfrac{1}{9}+\dfrac{1}{27}\right)}{2.\left(1+\dfrac{1}{3}+\dfrac{1}{9}+\dfrac{1}{27}\right)}:\dfrac{4.\left(1+\dfrac{1}{7}+\dfrac{1}{49}-\dfrac{1}{343}\right)}{1.\left(1+\dfrac{1}{7}+\dfrac{1}{49}-\dfrac{1}{343}\right)}$

$B=\dfrac{1}{2}:4=\dfrac{1}{8}$

Vậy $B=\dfrac{1}{8}$

Câu 39. (Đề thi HSG 6 huyện Ba Vì 2017 - 2018)

a) $1152-\left(374+1152\right)+\left(374-65\right)$

b) $\dfrac{7}{12}+\dfrac{5}{6}+\dfrac{1}{4}-\dfrac{3}{7}-\dfrac{5}{12}$

c) $\dfrac{11.3^{22}.3^{7}-9^{15}}{\left(2.3^{14}\right)^{2}}$

d) $\dfrac{3}{2^2}.\dfrac{8}{3^2}.\dfrac{15}{4^2}....\dfrac{899}{30^2}$

Lời giải

a) $1152-\left(374+1152\right)+\left(374-65\right)=1152-374-1152+374-65$

$=\left(1152-1152\right)+\left(374-374\right)+\left(-65\right)=-65$

b) $\dfrac{7}{12}+\dfrac{5}{6}+\dfrac{1}{4}-\dfrac{3}{7}-\dfrac{5}{12}=\dfrac{7}{12}-\dfrac{5}{12}+\dfrac{5}{6}+\dfrac{1}{4}-\dfrac{3}{7}$

$=\dfrac{1}{6}+\dfrac{5}{6}+\dfrac{1}{4}-\dfrac{3}{7}=1+\dfrac{1}{4}-\dfrac{3}{7}=\dfrac{5}{4}-\dfrac{3}{7}=\dfrac{23}{28}$

c) $\frac{11.3^{22}.3^7-9^{15}}{\left(2.3^{14}\right)^2}=\frac{11.3^{29}-3^{30}}{2^2.3^{28}}=\frac{3^{29}.(11-3)}{2^2.3^{28}}=\frac{3^{29}.2^3}{2^2.3^{28}}=6$

d) $\frac{3}{2^2}.\frac{8}{3^2}.\frac{15}{4^2}.....\frac{899}{30^2}=\frac{1.3}{2.2}.\frac{2.4}{3.3}.\frac{3.5}{4.4}.....\frac{29.31}{30.30}$

$=\frac{1.2.3....29}{2.3.4.....30}.\frac{3.4.5....31}{2.3.4.....30}=\frac{1}{30}.\frac{31}{2}=\frac{31}{60}$

Câu 40. (Đề thi HSG 6 huyện Lý Nhân 2018 - 2019)

a) Tính: $M=\frac{\frac{7}{2012}+\frac{7}{9}-\frac{1}{4}}{\frac{5}{9}-\frac{3}{2012}-\frac{1}{2}}$

b) So sánh A và B biết: $A=\frac{2010}{2011}+\frac{2011}{2012}+\frac{2012}{2010}$ và $B=\frac{1}{3}+\frac{1}{4}+\frac{1}{5}+....+\frac{1}{17}$

Lời giải

$a) N=\frac{\left(\frac{7}{2012}+\frac{7}{9}-\frac{1}{4}\right).2012.9.2}{\left(\frac{5}{9}-\frac{3}{2012}-\frac{1}{2}\right).2012.9.2}=\frac{7.9.2+7.2012.2-1006.9}{5.2012.2-3.9.2-2012.9}=\frac{7.2021-503.9}{5.2012-3.9-1006.9}=\frac{9620}{979}$

b) $A=\left(1-\frac{1}{2011}\right)+\left(1-\frac{1}{2012}\right)+\left(1+\frac{2}{2010}\right)$

$A=3+\left(\frac{1}{2010}-\frac{1}{2011}\right)+\left(\frac{1}{2010}-\frac{1}{2012}\right)\Rightarrow A>3$

$B=\left(\frac{1}{3}+\frac{1}{4}\right)+\left(\frac{1}{5}+.....+\frac{1}{9}\right)+\left(\frac{1}{10}+.....+\frac{1}{17}\right)$

$B<\frac{1}{2}.2+\frac{1}{5}.5+\frac{1}{8}.8\Rightarrow B<3$

Từ đó suy ra $A>B$

Câu 41. (Đề thi HSG 6 huyện Hương Sơn 2019 - 2019)

Tính giá tri của các biểu thức sau:

$a) 2.\left[\left(6^2-24\right):4\right]+2014$

$b)\left(1+2\frac{1}{3}-3\frac{1}{4}\right):\left(1+3\frac{7}{12}-4\frac{1}{2}\right)$

Lời giải

$a) 2.\left[\left(6^2-24\right):4\right]+2014=2.\left[(36-24):4\right]+2014=2020$

$b)\left(1+2\frac{1}{3}-3\frac{1}{4}\right):\left(1+3\frac{7}{12}-4\frac{1}{2}\right)=\left(\frac{1}{3}-\frac{1}{4}\right):\left(\frac{7}{12}-\frac{1}{2}\right)=1$

Câu 42. (Đề thi HSG 6 huyện Bạch Thông 2018 - 2019)

a) Tìm tích $\left(\frac{1}{2}-1\right)\left(\frac{1}{3}-1\right)\left(\frac{1}{4}-1\right).....\left(\frac{1}{100}-1\right)$

b) So sánh A và B biết: $A=\frac{2013.2014-1}{2013.2014}$ và $B=\frac{2014.2015-1}{2014.2015}$

Lời giải

a) Ta có:

$\left(\frac{1}{2}-1\right)\left(\frac{1}{3}-1\right)\left(\frac{1}{4}-1\right).....\left(\frac{1}{100}-1\right)$

$=\frac{-1}{2}.\frac{-2}{3}.\frac{-3}{4}.....\frac{-99}{100}=\frac{-\left(1.2.3.4....99\right)}{2.3.4....100}=\frac{-1}{100}$

b) Ta có:

$A=\frac{2013.2014-1}{2013.2014}=1-\frac{1}{2013.2014}$

$B=\frac{2014.2015-1}{2014.2015}=1-\frac{1}{2014.2015}$

Vì $\frac{1}{2013.2014}>\frac{1}{2014.2015}$ nên $A<B$

Câu 43. (Đề thi HSG 6 huyện Bạch Thông 2018 - 2019)

Thực hiện phép tính

$A=\left[540:\left(23,7-19,7\right)\right]+42.\left(132+75-36\right)-7317$

$B=\frac{2^{10}.13+2^{10}.65}{2^8.104}$

Lời giải

$a)A=\left(540:4\right)+42.171-7317$

$A=135+7182-7317=0$

$B=\frac{2^{10}.13+2^{10}.65}{2^8.104}=\frac{2^{10}.13.\left(1+5\right)}{2^8.8.13}=\frac{2^{10}.13.6}{2^8.2^3.13}=3$

Câu 44. (Đề thi HSG 6 huyện Phúc Thọ 2018-2019)

Thực hiện phép tính (tính nhanh nếu có thể)

$a)M=\left(\frac{-5}{7}+\frac{5}{11}\right):\left(\frac{-10}{3}\right)+\left(\frac{-2}{7}+\frac{6}{11}\right):\left(\frac{-10}{3}\right)$

$b)P=1+\frac{1}{2}+\frac{1}{2^2}+.....+\frac{1}{2^{99}}+\frac{1}{2^{100}}+\frac{1}{2^{100}}$

Lời giải

$a)M=\left(\frac{-5}{7}+\frac{5}{11}\right):\left(\frac{-10}{3}\right)+\left(\frac{-2}{7}+\frac{6}{11}\right):\left(\frac{-10}{3}\right)$

$=\left(\frac{-5}{7}+\frac{5}{11}\right).\frac{3}{-10}+\left(\frac{-2}{7}+\frac{6}{11}\right).\frac{3}{-10}$

$=\frac{3}{-10}.\left(\frac{-5}{7}+\frac{5}{11}+-\frac{2}{7}+\frac{6}{11}\right)=\frac{3}{-10}.(-1+1)=0$

$b)P=2P-P=\left(2+\frac{1}{2^{99}}\right)-\left(\frac{1}{2^{100}}+\frac{1}{2^{100}}\right)=\left(2+\frac{1}{2^{99}}\right)-\frac{1}{2^{99}}=2$

Câu 45. (Đề thi HSG 6 huyện Hoằng Hóa 2018-2019)

Tính giá trị các biểu thức sau:

$a)A=\frac{2}{3}+\frac{5}{6}:5-\frac{1}{18}.(-3)^2$

$b)B=3.\left\{5.\left[\left(5^2+2^3\right):11\right]-16\right\}+2015$

$c)C=\left(1+\frac{1}{1.3}\right)\left(1+\frac{1}{2.4}\right)\left(1+\frac{1}{3.5}\right).....\left(1+\frac{1}{2014.2016}\right)$

Lời giải

$a)A=\frac{2}{3}+\frac{5}{6}:5-\frac{1}{18}.(-3)^2=\frac{2}{3}+\frac{1}{6}-\frac{1}{2}=\frac{1}{3}$

$b)B=3.\left\{5.\left[\left(5^2+2^3\right):11\right]-16\right\}+2015=3.\left\{5.[33:11]-16\right\}+2015=2012$

$c)C=\left(1+\frac{1}{1.3}\right)\left(1+\frac{1}{2.4}\right)\left(1+\frac{1}{3.5}\right).....\left(1+\frac{1}{2014.2016}\right)$

$=\frac{2^2}{1.3}.\frac{3^2}{2.4}.....\frac{2015^2}{2014.2016}=\frac{(2.3.4.....2015).(2.3.4....2015)}{(1.2.3....2014).(3.4.5.....2016)}=\frac{2015}{1008}$

Câu 46. (Đề thi HSG 6 huyện Quỳnh Lưu 2018- 2019)

$16+(27-7.6)-(94.7-27.99)$

a) Tính nhanh:

b) Tính tổng: $A=\frac{2}{1.4}+\frac{2}{4.7}+\frac{2}{7.10}+.....+\frac{2}{97.100}$

Lời giải

$a)16+(27-7.6)-(94.7-27.99)=16+27-7.6-94.7+27.99$

$=16+27+27.99-7.6-94.7=16+27.100-7.100$

$=16+100.(27-7)=16+100.20=2000+16=2016$

$b)A=\frac{2}{1.4}+\frac{2}{4.7}+\frac{2}{7.10}+.....+\frac{2}{97.100}$

$=\frac{2}{3}.\left(\frac{1}{1}-\frac{1}{4}+\frac{1}{4}-\frac{1}{7}+\frac{1}{7}-\frac{1}{10}+.....+\frac{1}{97}-\frac{1}{100}\right)=\frac{2}{3}.\left(\frac{1}{1}-\frac{1}{100}\right)=\frac{33}{50}$

Câu 47. (Đề thi HSG 6 tỉnh Đồng Tháp 2018- 2019)

Thực hiện phép tính:

1) $A=\dfrac{5.\left(2^2.3^2\right)^9.\left(2^2\right)^6-2.\left(2^2.3\right)^{14}.3^4}{5.2^{28}.3^{18}-7.2^{29}.3^{18}}$

2) $B=81.\left[\dfrac{12-\dfrac{12}{7}-\dfrac{12}{289}-\dfrac{12}{85}}{4-\dfrac{4}{7}-\dfrac{4}{289}-\dfrac{4}{85}}:\dfrac{5+\dfrac{5}{13}+\dfrac{5}{169}+\dfrac{5}{91}}{6+\dfrac{6}{13}+\dfrac{6}{169}+\dfrac{6}{91}}\right].\dfrac{158158158}{711711711}$

Lời giải

$a)A=\dfrac{5.\left(2^2.3^2\right)^9.\left(2^2\right)^6-2.\left(2^2.3\right)^{14}.3^4}{5.2^{28}.3^{18}-7.2^{29}.3^{18}}=\dfrac{5.2.3^{18}.2^{12}-2.2^{28}.3^{14}.3^4}{5.2^{28}.3^{18}-7.2^{29}.3^{18}}$

$=\dfrac{5.2^{30}.3^{18}-2^{29}.3^{18}}{2^{28}.3^{18}.(5-7.2)}=\dfrac{2^{29}.3^{18}.(5.2-1)}{2^{28}.3^{18}.(5-14)}=\dfrac{2.9}{-9}=-2$

$b)B=81.\left[\dfrac{12.\left(1-\dfrac{1}{7}-\dfrac{1}{289}-\dfrac{1}{85}\right)}{4.\left(1-\dfrac{1}{7}-\dfrac{1}{289}-\dfrac{1}{85}\right)}:\dfrac{5.\left(1+\dfrac{1}{13}+\dfrac{1}{169}+\dfrac{1}{91}\right)}{6.\left(1+\dfrac{1}{13}+\dfrac{1}{169}+\dfrac{1}{91}\right)}\right].\dfrac{158.1001001}{711.1001001}$

$=81.\left(\dfrac{12}{4}:\dfrac{5}{6}\right).\dfrac{158}{711}=81.\dfrac{18}{5}.\dfrac{2}{9}=\dfrac{324}{5}$

Câu 48. (Đề thi HSG 6 tỉnh Đồng Tháp 2018- 2019)

Cho $A=\dfrac{1}{2}+\dfrac{3}{2}+\left(\dfrac{3}{2}\right)^2+\left(\dfrac{3}{2}\right)^3+\left(\dfrac{3}{2}\right)^4+.....+\left(\dfrac{3}{2}\right)^{2012}$ và $B=\left(\dfrac{3}{2}\right)^{2013}:2$

Tính $B-A$

Lời giải

a) Ta có:

$A=\dfrac{1}{2}+\dfrac{3}{2}+\left(\dfrac{3}{2}\right)^2+\left(\dfrac{3}{2}\right)^3+\left(\dfrac{3}{2}\right)^4+.....+\left(\dfrac{3}{2}\right)^{2012}$ (1)

$\Rightarrow\dfrac{3}{2}A=\dfrac{3}{4}+\left(\dfrac{3}{2}\right)^2+\left(\dfrac{3}{2}\right)^3+\left(\dfrac{3}{2}\right)^4+.....+\left(\dfrac{3}{2}\right)^{2012}+\left(\dfrac{3}{2}\right)^{2013}$ (2)

Lấy (2) – (1) ta được:

$\dfrac{3}{2}A-A=\left(\dfrac{3}{2}\right)^{2013}+\dfrac{3}{4}-\dfrac{1}{2}-\dfrac{3}{2}\Rightarrow A=\dfrac{3^{2013}}{2^{2012}}+\dfrac{1}{2}$

Vậy $B-A=\dfrac{3^{2013}}{2^{2014}}-\dfrac{3^{2013}}{2^{2012}}+\dfrac{5}{2}$

Câu 49. (Đề thi HSG 6 huyện Tư Nghĩa 2018- 2019)

Không quy đồng hãy tính tổng sau: $A=\dfrac{-1}{20}+\dfrac{-1}{30}+\dfrac{-1}{42}+\dfrac{-1}{56}+\dfrac{-1}{72}+\dfrac{-1}{90}$

Lời giải

Ta có:

$$A=\frac{-1}{20}+\frac{-1}{30}+\frac{-1}{42}+\frac{-1}{56}+\frac{-1}{72}+\frac{-1}{90}=-\left(\frac{1}{4.5}+\frac{1}{5.6}+\frac{1}{6.7}+\frac{1}{7.8}+\frac{1}{8.9}+\frac{1}{9.10}\right)$$

$$=-\left(\frac{1}{4}-\frac{1}{5}+\frac{1}{5}-\frac{1}{6}+\frac{1}{6}-\frac{1}{7}+.....+\frac{1}{9}-\frac{1}{10}\right)=-\left(\frac{1}{4}-\frac{1}{10}\right)=-\frac{3}{20}$$

Câu 50. (Đề thi HSG 6 huyện Vĩnh Lộc 2018- 2019)

Thực hiện phép tính:

a) $A=1.2.3....9-1.2.3....8-1.2.3.....8.8$

b) $B=\dfrac{\left(3.4.2^{16}\right)^2}{11.2^{13}.4^{11}-16^9}$

c) $C=70.\left(\dfrac{131313}{565656}+\dfrac{131313}{727272}+\dfrac{131313}{909090}\right)$

d) Thực hiện phép tính: $B=\dfrac{1}{4.9}+\dfrac{1}{9.14}+\dfrac{1}{14.19}+.....+\dfrac{1}{64.69}$

Lời giải

a) $A=1.2.3...9-1.2.3..8-1.2.3...8.8=1.2.3...8.\left(9-1-8\right)=0$

b) $B=\dfrac{\left(3.4.2^{16}\right)^2}{11.2^{13}.4^{11}-16^9}=\dfrac{\left(3.2^2.2^{16}\right)^2}{11.2^{13}.2^{22}-2^{36}}=\dfrac{9.2^{36}}{11.2^{35}-2^{36}}=\dfrac{9.2^{36}}{2^{35}.\left(11-2\right)}=\dfrac{9.2^{36}}{2^{35}.9}=2$

c) $C=70.\left(\dfrac{131313}{565656}+\dfrac{131313}{727272}+\dfrac{131313}{909090}\right)=70.\left(\dfrac{13}{56}+\dfrac{13}{72}+\dfrac{13}{90}\right)$

$=70.13.\left(\dfrac{1}{7.8}+\dfrac{1}{8.9}+\dfrac{1}{9.10}\right)=70.13.\left(\dfrac{1}{7}-\dfrac{1}{10}\right)=39$

d) $B=\dfrac{1}{4.9}+\dfrac{1}{9.14}+\dfrac{1}{14.19}+.....+\dfrac{1}{64.69}=\dfrac{1}{5}.\left(\dfrac{1}{4}-\dfrac{1}{9}+\dfrac{1}{9}-\dfrac{1}{14}+\dfrac{1}{14}-\dfrac{1}{19}.....+\dfrac{1}{64}-\dfrac{1}{69}\right)$

$=\dfrac{1}{5}.\left(\dfrac{1}{4}-\dfrac{1}{69}\right)=\dfrac{13}{276}$

Câu 51. (Đề thi HSG 6 CẤP TRƯỜNG 2018- 2019)

Tính giá trị biểu thức: $2010^{2010}.\left(7^{10}:7^8-3.2^4-2^{2010}:2^{2010}\right)$

Lời giải

$2010^{2010}.\left(7^{10}:7^8-3.2^4-2^{2010}:2^{2010}\right)=2010^{2010}.\left(49-3.16-1\right)=0$

Câu 52. (Đề thi HSG 6 huyện Lâm Thao 2018-2019)

Tính giá trị biểu thức sau:

$$B=\left(2017-\frac{1}{4}-\frac{2}{5}-\frac{3}{6}-\frac{4}{7}-.....-\frac{2017}{2020}\right):\left(\frac{1}{20}+\frac{1}{25}+\frac{1}{30}+\frac{1}{35}+.....+\frac{1}{10100}\right)$$

Lời giải

$B=15$

Câu 53. (Đề thi HSG 6 cấp trường 2018-2019)

Tính giá trị các biểu thức sau:

a) $A=(-1).(-1)^2.(-1)^3.(-1)^4.....(-1)^{2010}.(-1)^{2011}$

b) $B=70.\left(\dfrac{131313}{565656}+\dfrac{131313}{727272}+\dfrac{131313}{909090}\right)$

c) $C=\dfrac{2a}{3b}+\dfrac{3b}{4c}+\dfrac{4c}{5d}+\dfrac{5d}{2a}$,Biết $\dfrac{2a}{3b}=\dfrac{3b}{4c}=\dfrac{4c}{5d}=\dfrac{5d}{2a}$

Lời giải

a) $-1.1.(-1).....(-1).1.(-1)=-1$

b) $B=70.\left(\dfrac{13}{56}+\dfrac{13}{72}+\dfrac{13}{90}\right)=70.13.\left(\dfrac{1}{7.8}+\dfrac{1}{8.9}+\dfrac{1}{9.10}\right)=70.13.\left(\dfrac{1}{7}-\dfrac{1}{10}\right)=39$

c) Đặt $\dfrac{2a}{3b}=\dfrac{3b}{4c}=\dfrac{4c}{5d}=\dfrac{5d}{2a}=k$

Ta có: $\dfrac{2a}{3b}.\dfrac{3b}{4c}.\dfrac{4c}{5d}.\dfrac{5d}{2a}=k^4\Rightarrow k^4=1\Rightarrow k=\pm1\Rightarrow C=\pm4$

Câu 54. (Đề thi HSG 6 huyện Bạch Thông 2018-2019)

Thực hiện phép tính

$A=\left[540:(23,7-19,7)\right]+42.(132+75-36)-7317$

$B=\dfrac{2^{10}.13+2^{10}.65}{2^8.104}$

Lời giải

$A=(540:4)+42.171-7317$

$A=135+7182-7317=0$

$B=\dfrac{2^{10}.13+2^{10}.65}{2^8.104}=\dfrac{2^{10}.13.(1+5)}{2^8.8.13}=\dfrac{2^{10}.13.6}{2^8.2^3.13}=3$

Câu 55. (Đề thi HSG 6 huyện Bạch Thông 2018-2019)

Tìm tích $\left(\dfrac{1}{2}-1\right)\left(\dfrac{1}{3}-1\right)\left(\dfrac{1}{4}-1\right).....\left(\dfrac{1}{100}-1\right)$

Lời giải

Ta có $\left(\dfrac{1}{2}-1\right)\left(\dfrac{1}{3}-1\right)\left(\dfrac{1}{4}-1\right).....\left(\dfrac{1}{100}-1\right)$

$=\dfrac{-1}{2}.\dfrac{-2}{3}.\dfrac{-3}{4}.....\dfrac{-99}{100}=\dfrac{-(1.2.3.4....99)}{2.3.4....100}=\dfrac{-1}{100}$

Câu 56. (Đề thi HSG 6 huyện Tam Dương 2017-2018)

Rút gọn biểu thức: $\dfrac{10.11+50.55+70.77}{11.12+55.60+77.84}$

Lời giải

Ta có: $\dfrac{10.11+50.55+70.77}{11.12+55.60+77.84}=\dfrac{10.11.(1+5.5+7.7)}{11.12.(1+5.5+7.7)}=\dfrac{5}{6}$

Câu 57. (Đề thi HSG 6 Trường Nguyễn Chích – Huyện Đông Sơn 2017-2018)

Tính hợp lý:

a) $21.7^2-11.7^2+90.7^2+49.125.16$

b) $\dfrac{5.4^{15}.9^9-4.3^{20}.8^9}{5.2^9.6^{19}-7.2^{29}.27^6}$

Lời giải

a) $21.7^2-11.7^2+90.7^2+49.125.16=7^2.(21-11+90)+49.125.16$

$=49.100+49.100.20=49.100(1+20)=49.100.21$

b) $\dfrac{5.4^{15}.9^9-4.3^{20}.8^9}{5.2^9.6^{19}-7.2^{29}.27^6}=\dfrac{5.2^{30}.3^{18}-2^2.3^{20}.2^{27}}{5.2^9.2^{19}.3^{19}-7.2^{29}.3^{18}}$

$=\dfrac{2^{29}.3^{18}.(5.2-3^2)}{2^{28}.3^{18}.(5.3-7.2)}=2$

Câu 58. (Đề thi HSG 6 huyện Sơn Tây 2019-2020)

Tính giá trị các biểu thức sau:

a) $A=\dfrac{5}{6}+6\dfrac{5}{6}\left(11\dfrac{5}{20}-9\dfrac{1}{4}\right):8\dfrac{1}{3}$

b) $B=2^3.5^3-3\left\{400-\left[673-2^3.\left(7^8:7^6+7^0\right)\right]\right\}$

c) $C=\dfrac{5}{2.1}+\dfrac{4}{1.11}+\dfrac{3}{11.2}+\dfrac{1}{2.15}+\dfrac{13}{15.4}$

Lời giải

a) $\dfrac{5}{6}+\dfrac{41}{6}\left(11\dfrac{1}{4}-9\dfrac{1}{4}\right):\dfrac{25}{3}=\dfrac{5}{6}+\dfrac{41}{6}.2.\dfrac{3}{25}=\dfrac{5}{6}+\dfrac{41}{25}=\dfrac{125}{150}+\dfrac{246}{150}=\dfrac{371}{150}=2\dfrac{71}{150}$

b) $=8.125-3\left\{400-\left[673-8.50\right]\right\}=1000-3.\left\{400-273\right\}=619$

c) $B=\dfrac{5}{2.1}+\dfrac{4}{1.11}+\dfrac{3}{11.2}+\dfrac{1}{2.15}+\dfrac{13}{15.4}=7.\left(\dfrac{5}{2.7}+\dfrac{4}{7.11}+\dfrac{3}{11.14}+\dfrac{1}{14.15}+\dfrac{13}{15.28}\right)$

$=7.\left(\dfrac{1}{2}-\dfrac{1}{7}+\dfrac{1}{7}-\dfrac{1}{11}+\dfrac{1}{11}-\dfrac{1}{14}+\dfrac{1}{14}-\dfrac{1}{15}+\dfrac{1}{15}-\dfrac{1}{28}\right)=7.\left(\dfrac{1}{2}-\dfrac{1}{28}\right)=\dfrac{13}{4}$

Câu 59. (Đề HSG huyện Gia Viên 2018 – 2019)

Thực hiện phép tính

a) $A=\dfrac{5.\left(2^2.3^2\right)^9.\left(2^2\right)^6-2.\left(2^2.3\right)^{14}.3^4}{5.2^{28}.3^{18}-7.2^{29}.3^{18}}$

b) $B=81.\left[\dfrac{12-\dfrac{12}{7}-\dfrac{12}{289}-\dfrac{12}{85}}{4-\dfrac{4}{7}-\dfrac{4}{289}-\dfrac{4}{85}}:\dfrac{5+\dfrac{5}{13}+\dfrac{5}{169}+\dfrac{5}{91}}{6+\dfrac{6}{13}+\dfrac{6}{169}+\dfrac{6}{91}}\right].\dfrac{158158158}{711711711}$

Lời giải

a) Ta có:

$$A=\frac{5.\left(2^2.3^2\right)^9.\left(2^2\right)^6-2.\left(2^2.3\right)^{14}.3^4}{5.2^{28}.3^{18}-7.2^{29}.3^{18}}=\frac{5.2^{18}.3^{18}.2^{12}-2.2^{28}.3^{14}.3^4}{5.2^{28}.3^{18}-7.2^{29}.3^{18}}$$

$$=\frac{5.2^{30}.3^{18}-2^{29}.3^{18}}{2^{28}.3^{18}.(5-7.2)}=\frac{2^{29}.3^{18}.(5.2-1)}{2^{28}.3^{18}.(5-14)}=\frac{2.9}{-9}=-2$$

b) Ta có:

$$B=81.\left[\frac{12-\frac{12}{7}-\frac{12}{289}-\frac{12}{85}}{4-\frac{4}{7}-\frac{4}{289}-\frac{4}{85}}:\frac{5+\frac{5}{13}+\frac{5}{169}+\frac{5}{91}}{6+\frac{6}{13}+\frac{6}{169}+\frac{6}{91}}\right].\frac{158158158}{711711711}$$

$$=81.\left[\frac{12.\left(1-\frac{1}{7}-\frac{1}{289}-\frac{1}{85}\right)}{4.\left(1-\frac{1}{7}-\frac{1}{289}-\frac{1}{85}\right)}:\frac{5.\left(1+\frac{1}{13}+\frac{1}{169}+\frac{1}{91}\right)}{6.\left(1+\frac{1}{13}+\frac{1}{169}+\frac{1}{91}\right)}\right].\frac{158.1001001}{711.1001001}$$

$$=81.\left(\frac{12}{4}:\frac{5}{6}\right).\frac{158}{711}=81.\frac{18}{5}.\frac{2}{9}=\frac{324}{5}=64,8$$

Câu 60. (Đề thi HSG 6 huyện Lương Tài 2015 – 2016)

Thực hiện phép tính (tính hợp lý nếu có thể)

$a)1968:16+5136:16-704:16$

$b)2^3.5^3-3\left\{400-\left[673-2^3.\left(7^8:7^6+7^0\right)\right]\right\}$

Lời giải

$a)=16.(123+321-44):16=400$

$b)=8.125-3.\{400-[673-8.50]\}=1000-3.\{400-273\}=619$

Câu 61. (Đề thi HSG 6 huyện Việt Yên 2018-2019)

Thực hiện phép tính

a) $A=\frac{5.\left(2^2.3^2\right)^9.\left(2^2\right)^6-2.\left(2^2.3\right)^{14}.3^4}{5.2^{28}.3^{18}-7.2^{29}.3^{18}}$

b) $B=81.\left[\frac{12-\frac{12}{7}-\frac{12}{289}-\frac{12}{85}}{4-\frac{4}{7}-\frac{4}{289}-\frac{4}{85}}:\frac{5+\frac{5}{13}+\frac{5}{169}+\frac{5}{91}}{6+\frac{6}{13}+\frac{6}{169}+\frac{6}{91}}\right].\frac{158158158}{711711711}$

Lời giải

a) Ta có:

$$A=\frac{5.\left(2^2.3^2\right)^9.\left(2^2\right)^6-2.\left(2^2.3\right)^{14}.3^4}{5.2^{28}.3^{18}-7.2^{29}.3^{18}}=\frac{5.2^{18}.3^{18}.2^{12}-2.2^{28}.3^{14}.3^4}{5.2^{28}.3^{18}-7.2^{29}.3^{18}}$$

$$=\frac{5.2^{30}.3^{18}-2^{29}.3^{18}}{2^{28}.3^{18}.(5-7.2)}=\frac{2^{29}.3^{18}.(5.2-1)}{2^{28}.3^{18}.(5-14)}=\frac{2.9}{-9}=-2$$

b) Ta có:

$$B=81.\left[\frac{12-\frac{12}{7}-\frac{12}{289}-\frac{12}{85}}{4-\frac{4}{7}-\frac{4}{289}-\frac{4}{85}}:\frac{5+\frac{5}{13}+\frac{5}{169}+\frac{5}{91}}{6+\frac{6}{13}+\frac{6}{169}+\frac{6}{91}}\right].\frac{158158158}{711711711}$$

$$=81.\left[\frac{12.\left(1-\frac{1}{7}-\frac{1}{289}-\frac{1}{85}\right)}{4.\left(1-\frac{1}{7}-\frac{1}{289}-\frac{1}{85}\right)}:\frac{5.\left(1+\frac{1}{13}+\frac{1}{169}+\frac{1}{91}\right)}{6.\left(1+\frac{1}{13}+\frac{1}{169}+\frac{1}{91}\right)}\right].\frac{158.1001001}{711.1001001}$$

$$=81.\left(\frac{12}{4}:\frac{5}{6}\right).\frac{158}{711}=81.\frac{18}{5}.\frac{2}{9}=\frac{324}{5}=64,8$$

Câu 62. (Đề thi HSG 6 huyện Việt Yên 2017-2018)

Tính giá trị các biểu thức sau:

$a)A=(-1).(-1)^2.(-1)^3.(-1)^4.....(-1)^{2010}.(-1)^{2011}$

$b)B=70.\left(\frac{131313}{565656}+\frac{131313}{727272}+\frac{131313}{909090}\right)$

$c)C=\frac{2a}{3b}+\frac{3b}{4c}+\frac{4c}{5d}+\frac{5d}{2a}$ biết $\frac{2a}{3b}=\frac{3b}{4c}=\frac{4c}{5d}=\frac{5d}{2a}$

Lời giải

a) $-1.1.(-1).....(-1).1.(-1)=-1$

b) $B=70.\left(\frac{13}{56}+\frac{13}{72}+\frac{13}{90}\right)=70.13.\left(\frac{1}{7.8}+\frac{1}{8.9}+\frac{1}{9.10}\right)=70.13.\left(\frac{1}{7}-\frac{1}{10}\right)=39$

c) Đặt $\frac{2a}{3b}=\frac{3b}{4c}=\frac{4c}{5d}=\frac{5d}{2a}=k$

Ta có: $\frac{2a}{3b}.\frac{3b}{4c}.\frac{4c}{5d}.\frac{5d}{2a}=k^4\Rightarrow k^4=1\Rightarrow k=\pm1\Rightarrow C=\pm4$

Câu 63. (Đề thi HSG 6 Bắc Ninh 2018-2019)

1. Thực hiện tính A bằng cách hợp lý nhất:

$$A=\frac{2010.2011-1005}{2010.2010+1005}$$

2. Thực hiện phép tính: $B=33\left(1-\frac{2}{3}\right)\left(1-\frac{2}{5}\right).....\left(1-\frac{2}{99}\right)$

Lời giải

1. $A=\dfrac{2010.2011-1005}{2010.2010+1005}=\dfrac{2010.\left(2010+1\right)-1005}{2010.2010+1005}$

$=\dfrac{2010.2010+2010-1005}{2010.2010+1005}=\dfrac{2010.2010+1005}{2010.2010+1005}=1$

2. $B=33\left(1-\dfrac{2}{3}\right)\left(1-\dfrac{2}{5}\right).....\left(1-\dfrac{2}{99}\right)=33.\dfrac{1}{3}.\dfrac{3}{5}.\dfrac{5}{7}.....\dfrac{97}{99}=33.\dfrac{1}{99}=\dfrac{1}{3}$

Câu 64. (Đề thi HSG 6 huyện Lập Thạch 2018-2019)

Tính giá trị biểu thức sau:

$a)4\dfrac{1}{7}+\dfrac{-1}{6}.\left(12-5\dfrac{1}{7}\right)$

$b)\left(2+4+6+8+....+2014\right)-\left(3+5+7+9+.....+2011\right)$

$c)\left(1-\dfrac{1}{3}\right)\left(1-\dfrac{1}{6}\right)\left(1-\dfrac{1}{10}\right)\left(1-\dfrac{1}{15}\right).....\left(1-\dfrac{1}{780}\right)$

Lời giải

$a)4\dfrac{1}{7}+\dfrac{-1}{6}.\left(12-5\dfrac{1}{7}\right)=4\dfrac{1}{7}+\dfrac{-1}{6}.12-\dfrac{-1}{6}.5\dfrac{1}{7}=4\dfrac{1}{7}-2+\dfrac{1}{6}.\dfrac{36}{7}=3$

$b)\left(2+4+6+8+.....+2014\right)-\left(3+5+7+9+.....+2011\right)$

Nhận xét: $\left(2+4+6+8+....+2014\right)$ có 1007 số hạng

$\left(3+5+7+9+....+2011\right)$ có 1005 số hạng

$=\left(2-3\right)+\left(4-5\right)+\left(6-7\right)+\left(2010-2011\right)+\left(2012+2014\right)$ có 1006 nhóm

$=\left(-1\right)+\left(-1\right)+\left(-1\right)+.....+\left(-1\right)+4026$ có 1005 số hạng -1

$=-1005+4026=3021$

$c)\left(1-\dfrac{1}{3}\right).\left(1-\dfrac{1}{6}\right).\left(1-\dfrac{1}{10}\right).\left(1-\dfrac{1}{15}\right).....\left(1-\dfrac{1}{780}\right)=\dfrac{2}{3}.\dfrac{5}{6}.\dfrac{9}{10}.\dfrac{14}{15}.....\dfrac{779}{780}$

$=\dfrac{4}{6}.\dfrac{10}{12}.\dfrac{18}{20}.\dfrac{28}{30}....\dfrac{1558}{1560}=\dfrac{1.4}{2.3}.\dfrac{2.5}{3.4}.\dfrac{3.6}{4.5}.....\dfrac{38.41}{39.40}$

$=\dfrac{1.2.3....38}{2.3.4.....39}.\dfrac{4.5.6.....41}{3.4.5.6....40}=\dfrac{1}{39}.\dfrac{41}{3}=\dfrac{41}{117}$

Câu 65. (Đề thi HSG 6 huyện Lập Thạch 2019-2020)

Thực hiện các phép tính sau một cách hợp lý:

$a)\left(10^2+11^2+12^2\right):\left(13^2+14^2\right)$

$b)1.2.3...9-1.2.3....8-1.2.3....7.8^2$

$c)\dfrac{\left(3.4.2^{16}\right)^2}{11.2^{13}.4^{11}-16^9}$

$d)1152-(374+1152)+(-65+374)$

$e)13-12+11+10-9+8-7-6+5-4+3+2-1$

Lời giải

$a)\left(10^2+11^2+12^2\right):\left(13^2+14^2\right)=(100+121+144):(169+196)=365:365=1$

$b)1.2.3....9-1.2.3...7.8-1.2.3...7.8^2=1.2.3...7.8.(9-1-8)=1.2.3...7.8...\times 0=0$

$c)\dfrac{\left(3.4.2^{16}\right)^2}{11.2^{13}.4^{11}-16^9}=\dfrac{\left(3.2^2.2^{16}\right)^2}{11.2^{13}.\left(2^2\right)^{11}-\left(2^4\right)^9}=\dfrac{3^2.\left(2^{18}\right)^2}{11.2^{13}.2^{22}-2^{36}}$

$=\dfrac{3^2.2^{36}}{11.2^{35}-2^{36}}=\dfrac{3^2.2^{36}}{2^{35}.(11-2)}=\dfrac{3^2.2}{9}=2$

$d)1152-(374+1152)+(-65+374)$

$=1152-374-1152+-65+374=(1152-1152)+(374-374)-65=-65$

$e)13-12+11+10-9+8-7-6+5-4+3+2-1$

$=13-(12-11-10+9)+(8-7-6+5)-(4-3-2-1)=13$

Câu 66. (Đề thi HSG 6 huyện Thạch Thành 2018-2019)

Tính giá trị các biểu thức sau:

$a)A=68.74+27.68-68$

$b)B=2^3.5^3-3\left\{539-\left[639-8.\left(7^8:7^6+2017^0\right)\right]\right\}$

$c)C=\left(\dfrac{151515}{161616}+\dfrac{17^9}{17^{10}}\right)-\left(\dfrac{1500}{1600}-\dfrac{1616}{1717}\right)$

$d)D=\left(\dfrac{1}{2^2}-1\right)\left(\dfrac{1}{3^2}-1\right)\left(\dfrac{1}{4^2}-1\right).....\left(\dfrac{1}{100^2}-1\right)$

Lời giải

$a)A=68.74+27.68-68=68.(74+27-1)=68.100=6800$

$b)B=2^3.5^3-3\left\{539-\left[639-8.\left(7^8:7^6+2017^0\right)\right]\right\}=8.125-3.\left\{539-\left[639-8.\left(7^2+1\right)\right]\right\}$

$=1000-3.\{539-[639+8.50]\}=1000-3.300=1000-900=100$

$c)C=\left(\dfrac{151515}{161616}+\dfrac{17^9}{17^{10}}\right)-\left(\dfrac{1500}{1600}-\dfrac{1616}{1717}\right)=\left(\dfrac{15}{16}+\dfrac{1}{17}\right)-\left(\dfrac{15}{16}-\dfrac{16}{17}\right)$

$=\left(\dfrac{15}{16}-\dfrac{15}{16}\right)+\left(\dfrac{1}{17}+\dfrac{16}{17}\right)=0+1=1$

$d)D=\left(\dfrac{1}{2^2}-1\right)\left(\dfrac{1}{3^2}-1\right)\left(\dfrac{1}{4^2}-1\right).....\left(\dfrac{1}{100^2}-1\right)=\left(\dfrac{1-4}{2^2}\right)\left(\dfrac{1-9}{3^2}\right).....\left(\dfrac{1-1000}{100^2}\right)$

$=\dfrac{-3}{2^2}.\dfrac{-8}{3^2}.\dfrac{-15}{4^2}.....\dfrac{-9999}{100^2}=-\dfrac{1.3}{2.3}.\dfrac{2.4}{3.3.}.\dfrac{3.5}{4.4}.....\dfrac{99.1010}{100.100}$

$$= -\frac{(1.2.3.....99).(3.4.5.....101)}{(2.3.4.....100).(2.3.4.....100)} = -\frac{101}{200}$$

Câu 67. (Đề thi HSG 6 huyện Việt Yên 2019-2020)

Tính nhanh:

a) $\frac{3^2}{1.4}+\frac{3^2}{4.7}+\frac{3^2}{7.10}+.....+\frac{3^2}{97.100}$

b) $B=(-528)+(-12)+(-211)+540+2225$

c) $M=\frac{1+3+3^2+3^3+....+3^{2012}}{3^{2004}-3}$

d) $D=\frac{2}{20}+\frac{2}{30}+\frac{2}{42}+\frac{2}{56}+\frac{2}{72}+\frac{2}{90}$

Lời giải

$a) A=\frac{3^2}{1.4}+\frac{3^2}{4.7}+\frac{3^2}{7.10}+.....+\frac{3^2}{97.100}=3.\left(\frac{3}{1.4}+\frac{3}{4.7}+\frac{3}{7.10}+....+\frac{3}{97.100}\right)$

$=3.\left(\frac{1}{1}-\frac{1}{4}+\frac{1}{4}-\frac{1}{7}+....+\frac{1}{97}-\frac{1}{100}\right)=3.\frac{99}{100}=\frac{297}{100}$

$b) B=(-528)+(-12)+(-211)+540+2225$

$=(-528)+(-12)+540+(-211+211)+2014=2014$

$c) M=\frac{1+3+3^2+3^3+.....+3^{2012}}{3^{2014}-3}$

$A=1+3+3^2+3^3+.....+3^{2012} \Rightarrow A=3^{2013}-1$

$B=3^{2014}-3 \Rightarrow B=3.(3^{2013}-1) \Rightarrow M=\frac{1}{3}$

d) $D=\frac{2}{20}+\frac{2}{30}+\frac{2}{42}+\frac{2}{56}+\frac{2}{72}+\frac{2}{90}$

$=2\left(\frac{1}{4.5}+\frac{1}{5.6}+\frac{1}{6.7}+\frac{1}{7.8}+\frac{1}{8.9}+\frac{1}{9.10}\right)$

$=2\left(\frac{1}{4}-\frac{1}{5}+\frac{1}{5}-\frac{1}{6}+\frac{1}{6}-\frac{1}{7}+\frac{1}{7}-\frac{1}{8}+\frac{1}{8}-\frac{1}{9}+\frac{1}{9}-\frac{1}{10}\right)$

$=2\left(\frac{1}{4}-\frac{1}{10}\right)=2\frac{5-2}{20}=\frac{3}{10}$

Câu 68. (Đề thi HSG 6 huyện Lương Tài 2015-2016)

Thực hiện phép tính (tính hợp lý nếu có thể)

$a) 1968:16+5136:16-704:16$ $\quad$ $b) 2^3.5^3-3\left\{400-\left[673-2^3.(7^8:7^6+7^0)\right]\right\}$

Lời giải

$a) 1968:16+5136:16-704:16=16.(123+321-44):16=400$

$b) 2^3.5^3-3\{400-[673-2^3.(7^8:7^6+7^0)]\}$

$=8.125-3.\{400-[673-8.50]\}=1000-3.\{400-273\}=619$

Câu 69. (Đề thi HSG 6 huyện Hoằng Hóa 2017-2018)

Thực hiện phép tính

$$a)\ A=81.\left[\frac{12-\frac{12}{7}-\frac{12}{289}-\frac{12}{85}}{4-\frac{4}{7}-\frac{4}{289}-\frac{4}{85}}:\frac{5+\frac{5}{13}+\frac{5}{169}+\frac{5}{91}}{6+\frac{6}{13}+\frac{6}{169}+\frac{6}{91}}\right].\frac{158158158}{711711711}$$

$$b)\ B=\frac{5.\left(2^2.3^2\right)^9.\left(2^2\right)^6-2.\left(2^2.3\right)^{14}.3^4}{5.2^{28}.3^{18}-7.2^{29}.3^{18}}$$

Lời giải

$$a)A=81.\left[\frac{12.\left(1-\frac{1}{7}-\frac{1}{289}-\frac{1}{85}\right)}{4.\left(1-\frac{1}{7}-\frac{1}{289}-\frac{1}{85}\right)}:\frac{5.\left(1+\frac{1}{13}+\frac{1}{169}+\frac{1}{91}\right)}{6.\left(1+\frac{1}{13}+\frac{1}{169}+\frac{1}{91}\right)}\right].\frac{158.1001001}{711.1001001}$$

$$=81.\left(\frac{12}{4}:\frac{5}{6}\right).\frac{158}{711}=81.\frac{18}{5}.\frac{2}{9}=\frac{324}{5}$$

$$b)A=\frac{5.\left(2^2.3^2\right)^9.\left(2^2\right)^6-2.\left(2^2.3\right)^{14}.3^4}{5.2^{28}.3^{18}-7.2^{29}.3^{18}}=\frac{5.2.3^{18}.2^{12}-2.2^{28}.3^{14}.3^4}{5.2^{28}.3^{18}-7.2^{29}.3^{18}}$$

$$=\frac{5.2^{30}.3^{18}-2^{29}.3^{18}}{2^{28}.3^{18}.(5-7.2)}=\frac{2^{29}.3^{18}.(5.2-1)}{2^{28}.3^{18}.(5-14)}=\frac{2.9}{-9}=-2$$

Câu 70. (Đề thi HSG 6 Anh Sơn 2018-2019)

Thực hiện phép tính

$a) -32.56-32.25-32.19$

$b) 2^4.5-\left[131-(13-4)^2\right]$

$$c)\frac{9^3.25^3}{18^2.125^2}$$

Lời giải

$a) -32.56-32.25-32.19=-32.(56+25+19)=-32.100=-3200$

$b) 2^4.5-\left[131-(13-4)^2\right]=16.5-\left[131-9^2\right]=80-[131-81]=30$

$$c)\frac{9^3.25^3}{18^2.125^2}=\frac{3^6.5^6}{2^2.3^4.5^6}=\frac{3^2}{2^2}=\frac{9}{4}$$

Câu 71. (Đề thi HSG 6 huyện Thanh Chương 2018-2019)

Cho $A=\frac{2}{11.15}+\frac{2}{15.19}+\frac{2}{19.23}+.....+\frac{2}{51.55}$; $B=\left(-\frac{5}{3}\right).\frac{11}{2}.\left(\frac{1}{3}+1\right)$

Tính tích $A.B$

Lời giải

$A=\frac{2}{11.15}+\frac{2}{15.19}+\frac{2}{19.23}+.....+\frac{2}{51.55}$

$=\frac{1}{2}\left(\frac{1}{11}-\frac{1}{15}+.....+\frac{1}{51}-\frac{1}{55}\right)=\frac{1}{2}\left(\frac{1}{11}-\frac{1}{55}\right)=\frac{2}{55}$

$B=\left(-\frac{5}{3}\right).\frac{11}{2}.\left(\frac{1}{3}+1\right)=\left(-\frac{5}{3}\right).\frac{11}{2}.\frac{4}{3}=\frac{-55.2}{9}$

$\Rightarrow A.B=\frac{2}{55}.\left(\frac{-55.2}{9}\right)=\frac{-4}{9}$

Câu 72. (Đề thi HSG 6 huyện Tân Lập 2018-2019)

Tính giá trị biểu thức: $\frac{2^{12}.13+2^{12}.65}{2^{10}.104}+\frac{3^{10}.11+3^{10}.5}{3^9.2^4}$

Lời giải

$\frac{2^{12}.13+2^{12}.65}{2^{10}.104}+\frac{3^{10}.11+3^{10}.5}{3^9.2^4}=\frac{2^{12}.78}{2^{10}.104}+\frac{3^{10}.16}{3^9.16}=3+3=6$

Câu 73. (Đề thi HSG 6 huyện Hà Huy Tập)

$a)1.2.3.4....2015-1.2.3.4....2014-1.2.3.4...2013.2014^2$

$b)\frac{\left(3.4.2^{16}\right)^2}{11.2^{13}.4^{11}-16^9}$

$c)2015-\left(374+2015\right)+\left(-2014+374\right)$

Lời giải

$a)1.2.3.4.....2014.\left(2015-1-2014\right)=1.2.3.4....2014.0=0$

$b)\frac{\left(3.2^2.2^{16}\right)^2}{11.2^{13}.2^{22}-2^{36}}=\frac{\left(3.2^{18}\right)^2}{11.2^{35}-2^{36}}=\frac{9.2^{36}}{2^{35}.9}=2$

$c)2015-374-2015-2014+374=-2014$

Câu 74. (Đề thi HSG 6 2018 - 2019)

Tính nhanh: $A=\frac{1.5.6+2.10+12+4.20.24+9.45.54}{1.3.5+2.6.10+4.12.20+9.27.45}$

Lời giải

$\frac{1.5.6+2.10.12+4.20.24+9.45.54}{1.3.5+2.6.10+4.12.20+9.27.45}=\frac{1.5.6.\left(1+2.2.2+4.4.4+9.9.9\right)}{1.3.5.\left(1+2.2.2+4.4.4+9.9.9\right)}=\frac{1.5.6}{1.3.5}=2$

Câu 75. (Đề thi HSG6 huyện 2019 - 2020)

Thực hiện phép tính bằng cách hợp lý:

$1) A = \dfrac{636363.37 - 373737.63}{1+2+3+...+2017}$

$2) B = 1\dfrac{6}{41}.\left(\dfrac{12+\dfrac{12}{19}-\dfrac{12}{37}-\dfrac{12}{53}}{3+\dfrac{1}{3}-\dfrac{3}{37}-\dfrac{3}{53}} : \dfrac{4+\dfrac{4}{17}+\dfrac{4}{19}+\dfrac{4}{2006}}{5+\dfrac{5}{17}+\dfrac{5}{19}+\dfrac{5}{2006}}\right).\dfrac{124242423}{237373735}$

Lời giải

$1) A = \dfrac{636363.37 - 373737.63}{1+2+3+...+2017} = \dfrac{63.(10101.37) - 37.(10101.63)}{1+2+3+....+2017} = 0$

$2) B = 1\dfrac{6}{41}.\left(\dfrac{12+\dfrac{12}{19}-\dfrac{12}{37}-\dfrac{12}{53}}{3+\dfrac{1}{3}-\dfrac{3}{37}-\dfrac{3}{53}} : \dfrac{4+\dfrac{4}{17}+\dfrac{4}{19}+\dfrac{4}{2006}}{5+\dfrac{5}{17}+\dfrac{5}{19}+\dfrac{5}{2006}}\right).\dfrac{124242423}{237373735}$

$= \dfrac{47}{41}.\left(\dfrac{12.\left(1+\dfrac{1}{19}-\dfrac{1}{37}-\dfrac{1}{53}\right)}{3.\left(1+\dfrac{1}{19}-\dfrac{1}{37}-\dfrac{1}{53}\right)} : \dfrac{4.\left(1+\dfrac{1}{17}+\dfrac{1}{19}+\dfrac{1}{2006}\right)}{5.\left(1+\dfrac{1}{17}+\dfrac{1}{19}+\dfrac{1}{2006}\right)}\right).\dfrac{41.3.1010101}{47.5.1010101}$

$= \dfrac{47}{41}.\left(4.\dfrac{5}{4}\right).\dfrac{41.3}{47.3} = 3$

Câu 76. (Đề thi HSG 6 - 2019 - 2020)

Tính tổng $S = \dfrac{27+4500+135+550.2}{2+4+6+....+14+16+18}$

Lời giải

$S = \dfrac{270.450+270.550}{\dfrac{(2+18).9}{2}} = \dfrac{270.(450+550)}{90} = 3000$

Câu 77. (Đề thi HSG 6 2018-2019)

Tính các giá trị của biểu thức:

$a) A = 1+2+3+4+....+100$

$b) B = -1\dfrac{1}{5}.\dfrac{4\left(3+\dfrac{1}{3}-\dfrac{3}{7}-\dfrac{3}{53}\right)}{3+\dfrac{1}{3}-\dfrac{3}{7}-\dfrac{3}{53}} : \dfrac{4+\dfrac{4}{17}+\dfrac{4}{19}+\dfrac{4}{2003}}{5+\dfrac{5}{17}+\dfrac{5}{19}+\dfrac{5}{2003}}$

$c) C = \dfrac{1}{1.2}+\dfrac{1}{2.3}+\dfrac{1}{3.4}+\dfrac{1}{4.5}+....+\dfrac{1}{99.100}$

Lời giải

Tổng $S = 1+2+3+.....+100$ có 100 số hạng

$S = (1+100)+(2+99)+(3+98)+....+(50+51)$ có 50 cặp

$= 50.10 = 5050$

$A = -1\dfrac{1}{5}.\dfrac{4\left(3+\dfrac{1}{3}-\dfrac{3}{7}-\dfrac{3}{53}\right)}{3+\dfrac{1}{3}-\dfrac{3}{7}-\dfrac{3}{53}} : \dfrac{4+\dfrac{4}{17}+\dfrac{4}{19}+\dfrac{4}{2003}}{5+\dfrac{5}{17}+\dfrac{5}{19}+\dfrac{5}{2003}}$

$$A=-\frac{6}{5}.\frac{4}{1}:\frac{4\left(1+\frac{1}{17}+\frac{1}{19}+\frac{1}{2003}\right)}{5.\left(1+\frac{1}{17}+\frac{1}{19}+\frac{1}{2003}\right)}=-\frac{6}{5}.\frac{4}{1}:\frac{4}{5}=-6$$

c) $C=1-\frac{1}{2}+\frac{1}{2}-\frac{1}{3}+.....+\frac{1}{99}-\frac{1}{100}=\frac{99}{100}$

Câu 78. (Đề thi HSG 6 huyện Thanh Oai 2018 -2019)

Tính $A=\left(\frac{7777}{8585}-\frac{77}{85}+\frac{7777}{16362}-\frac{77}{162}\right).\frac{123498766}{987661234}$

Lời giải

Ta có:

$$\frac{7777}{8585}=\frac{7777:101}{8585:101}=\frac{77}{85}$$

$$\frac{7777}{16362}=\frac{7777:101}{16362:101}=\frac{77}{162}$$

$$\Rightarrow A=\left(\frac{75}{85}-\frac{75}{85}+\frac{77}{162}-\frac{77}{162}\right).\frac{123498766}{987661234}=0$$

Câu 79. (Đề thi HSG 6)

Tính: $A=\frac{1}{10}+\frac{1}{40}+\frac{1}{88}+\frac{1}{154}+\frac{1}{238}+\frac{1}{340}$

Lời giải

$$3A=\frac{3}{2.5}+\frac{3}{5.8}+\frac{3}{8.11}+.....+\frac{3}{17.20}$$

$$=\frac{1}{2}-\frac{1}{5}+\frac{1}{5}-\frac{1}{8}+.....+\frac{1}{17}-\frac{1}{20}$$

$$=\frac{1}{2}-\frac{1}{20}=\frac{9}{20}\Rightarrow A=\frac{3}{20}$$

Câu 80. (Đề thi HSG 6 TP Tam Kỳ 2018- 2019)

Tính hợp lý:

$$A=2\frac{17}{20}-1\frac{11}{15}+6\frac{9}{20}:3$$

$$B=\frac{20+\frac{19}{3}+\frac{19}{101}}{7+\frac{7}{13}+\frac{7}{19}+\frac{7}{101}}$$

$$C=\frac{1}{6}+\frac{1}{12}+\frac{1}{20}+\frac{1}{30}+\frac{1}{42}+\frac{1}{56}+\frac{1}{72}+\frac{1}{90}+\frac{1}{110}$$

Lời giải

$$a)2\frac{17}{20}-1\frac{11}{15}+6\frac{9}{20}:3=2\frac{17}{20}-1\frac{11}{15}+2\frac{3}{20}=5-1\frac{11}{15}=3\frac{4}{15}$$

$b) B = \dfrac{19+1+\dfrac{19}{13}+\dfrac{19}{101}}{7+\dfrac{7}{13}+\dfrac{7}{19}+\dfrac{7}{101}} = \dfrac{19+\dfrac{19}{19}+\dfrac{19}{13}+\dfrac{19}{101}}{7+\dfrac{7}{13}+\dfrac{7}{19}+\dfrac{7}{101}} = \dfrac{19.\left(1+\dfrac{1}{13}+\dfrac{1}{19}+\dfrac{1}{101}\right)}{7.\left(1+\dfrac{1}{13}+\dfrac{1}{19}+\dfrac{1}{101}\right)} = \dfrac{19}{7}$

$c) C = \dfrac{1}{6}+\dfrac{1}{12}+\dfrac{1}{20}+\dfrac{1}{30}+\dfrac{1}{42}+\dfrac{1}{56}+\dfrac{1}{72}+\dfrac{1}{90}+\dfrac{1}{110} = \dfrac{1}{2.3}+\dfrac{1}{3.4}+.....+\dfrac{1}{9.10}+\dfrac{1}{10.11}$

$= \dfrac{1}{2}-\dfrac{1}{3}+\dfrac{1}{3}-\dfrac{1}{4}+.....+\dfrac{1}{9}-\dfrac{1}{10}+\dfrac{1}{10}-\dfrac{1}{11} = \dfrac{1}{2}-\dfrac{1}{11} = \dfrac{9}{22}$

Câu 81. (Đề thi HSG 6 Ứng hòa 2019-2020)

Thực hiện phép tính bằng cách hợp lý

a) $P = \left(5.3^{11}+4.3^{12}\right):\left(3^9.5^2-3^9.2^3\right)$

b) $Q = 14.29+14.71+\left(1+2+3+....+99\right).\left(199199.198-198198.199\right)$

Lời giải

$a) P = \left(5.3^{11}+4.3^{12}\right):\left(3^9.5^2-3^9.2^3\right) = 3^{11}.\left(5+4.3\right):3^9.\left(5^2-2^3\right) = 3^{11}.17:3^9.17 = 9$

$b) Q = 14.29+14.71+\left(1+2+3+...+99\right).\left(199199.198-198198.109\right)$

$= 14.\left(29+71\right)+\left(1+2+3+...+99\right).0 = 1400$

Câu 82. (Đề thi HSG 6 Nghi Lộc 2019-2020)

Thực hiện các phép tính sau một cách hợp lý:

$a)\left(10^2+11^2+12^2\right):\left(13^2+14^2\right)$

$b) 1.2.3...9-1.2.3....8-1.2.3....7.8^2$

$c) \dfrac{\left(3.4.2^{16}\right)^2}{11.2^{13}.4^{11}-16^9}$

$d) 1152-\left(374+1152\right)+\left(-65+374\right)$

Lời giải

$a)\left(10^2+11^2+12^2\right):\left(13^2+14^2\right) = \left(100+121+144\right):\left(169+196\right) = 365:365 = 1$

$b) 1.2.3....9-1.2.3...7.8-1.2.3...7.8^2 = 1.2.3...7.8.\left(9-1-8\right) = 1.2.3...7.8...\times 0 = 0$

$c) \dfrac{\left(3.4.2^{16}\right)^2}{11.2^{13}.4^{11}-16^9} = \dfrac{\left(3.2^2.2^{16}\right)^2}{11.2^{13}.\left(2^2\right)^{11}-\left(2^4\right)^9} = \dfrac{3^2.\left(2^{18}\right)^2}{11.2^{13}.2^{22}-2^{36}}$

$= \dfrac{3^2.2^{36}}{11.2^{35}-2^{36}} = \dfrac{3^2.2^{36}}{2^{35}.\left(11-2\right)} = \dfrac{3^2.2}{9} = 2$

$d) 1152-\left(374+1152\right)+\left(-65+374\right)$

$= 1152-374-1152+-65+374$

$= \left(1152-1152\right)+\left(374-374\right)-65 = -65$

$e) 13-12+11+10-9+8-7-6+5-4+3+2-1$

$=13-(12-11-10+9)+(8-7-6+5)-(4-3-2-1)=13$

Câu 83. **(Đề thi HSG 6 Nghi Phú 2018- 2019)**

a) Rút gọn phân số sau: $\dfrac{2^3.3^3.5^3.7.8}{3.2^4.5^3.14}$

b) Tính $B=14:\left(4\dfrac{1}{12}-2\dfrac{5}{8}\right)+14.\dfrac{1}{4}.\dfrac{2}{3}$

Lời giải

a)18 *b*)$11\dfrac{14}{15}$

Câu 84. **(Đề thi HSG 6 Thanh Chương 2018- 2019)**

Thực hiện phép tính: $\dfrac{2181.729+243.81.27}{3^2.9^2.234+18.54.162.9+723.729}$

Lời giải

$\dfrac{2181.729+243.3.81.9}{3^2.9^2.234+9^3.2.6.162+723.729}=\dfrac{2181.729+729^2}{729.234+729.1944+723.729}$

$=\dfrac{729.(2181+729)}{729.(234+1944+723)}=\dfrac{729.2910}{729.2901}=\dfrac{970}{967}$

Câu 85. **(Đề thi HSG 6)**

a) Rút gọn biểu thức: $A=\dfrac{\dfrac{2}{7}+\dfrac{2}{5}+\dfrac{2}{17}-\dfrac{2}{193}}{\dfrac{3}{7}+\dfrac{3}{5}+\dfrac{3}{17}+\dfrac{3}{193}}$

b) Tính nhanh: $1+3-5-7+9+11-.....-397-399$

Lời giải

a) $A=\dfrac{2.\left(\dfrac{1}{7}+\dfrac{1}{5}+\dfrac{1}{17}-\dfrac{1}{293}\right)}{3.\left(\dfrac{1}{7}+\dfrac{1}{5}+\dfrac{1}{17}-\dfrac{1}{293}\right)}=\dfrac{2}{3}$

b) $1+3-5-7+9+11-....-397-399$

$=1+(3-5-7+9)+....+(395-397-399+401)-401$

$=1+0+.....+0-401=-401$

Câu 86. **(Đề thi HSG 6 huyện Thủy Nguyên 2017-2018)**

Tính giá trị của biểu thức (hợp lý nếu có thể)

a) $53.39+47.39-53.21-47.21$

$b)\ \dfrac{5}{2.1}+\dfrac{4}{1.11}+\dfrac{3}{11.2}+\dfrac{1}{2.15}+\dfrac{13}{15.4}$

Lời giải

$a)53.(39-21)+47.(39-21)=18.(53+47)=18.100=1800$

$b)=7.\left(\dfrac{5}{2.7}+\dfrac{4}{7.11}+\dfrac{3}{11.14}+\dfrac{1}{14.15}+\dfrac{13}{15.28}\right)$

$=7.\left(\dfrac{1}{2}-\dfrac{1}{7}+\dfrac{1}{7}-\dfrac{1}{11}+\dfrac{1}{11}-\dfrac{1}{14}+\dfrac{1}{14}-\dfrac{1}{15}+\dfrac{1}{15}-\dfrac{1}{28}\right)=7.\left(\dfrac{1}{2}-\dfrac{1}{28}\right)=\dfrac{13}{4}$

Câu 87. (Đề thi HSG 6)

Thực hiện các phép tính:

$a)\ S=1.2+2.3+3.4+.....+99.100$

$b)\left[528:(19,3-15,3)\right]+42.(128+75-32)-7314$

Lời giải

$a)S=1.2+2.3+3.4+.....+99.100$

$3S=1.2.3+2.3.(4-1)+3.4.(5-2)+.....+99.100.(101-98)$

$=1.2.3+2.3.4-1.2.3+3.4.5-2.3.4+.....+99.100.101-98.99.100$

$\Rightarrow S=99.100.101:3=333300$

$b)\left[528:(19,3-15,3)\right]+42.(128+75-32)-7314$

$=(528:4)+42.171-7314=121+7182-7314=0$

Câu 88. (Đề thi HSG 6)

Không quy đồng hãy tính hợp lý các tổng sau:

$a)A=\dfrac{-1}{20}+\dfrac{-1}{30}+\dfrac{-1}{42}+\dfrac{-1}{56}+\dfrac{-1}{72}+\dfrac{-1}{90}$

$b)B=\dfrac{5}{2.1}+\dfrac{4}{1.11}+\dfrac{3}{11.2}+\dfrac{1}{2.15}+\dfrac{13}{15.4}$

Lời giải

$a)A=\dfrac{-1}{20}+\dfrac{-1}{30}+\dfrac{-1}{42}+....+\dfrac{-1}{90}=-\left(\dfrac{1}{4.5}+\dfrac{1}{5.6}+\dfrac{1}{6.7}+....+\dfrac{1}{9.10}\right)$

$=-\left(\dfrac{1}{4}-\dfrac{1}{5}+.....+\dfrac{1}{9}-\dfrac{1}{10}\right)=-\left(\dfrac{1}{4}-\dfrac{1}{10}\right)=\dfrac{-3}{20}$

$b)B=\dfrac{5}{2.1}+\dfrac{4}{1.11}+\dfrac{3}{11.2}+\dfrac{1}{2.15}+\dfrac{13}{15.4}=7.\left(\dfrac{5}{2.7}+\dfrac{4}{7.11}+\dfrac{3}{11.14}+\dfrac{1}{14.15}+\dfrac{13}{15.28}\right)$

$$=7.\left(\frac{1}{2}-\frac{1}{7}+\frac{1}{7}-\frac{1}{11}+\frac{1}{11}-\frac{1}{14}+\frac{1}{14}-\frac{1}{15}+\frac{1}{15}-\frac{1}{28}\right)=7.\left(\frac{1}{2}-\frac{1}{28}\right)=3\frac{1}{4}$$

Câu 89. (Đề thi HSG 6)

Tính giá trị các biểu thức sau:

$a) A=(-1).(-1)^2.(-1)^3.(-1)^4.....(-1)^{2010}.(-1)^{2011}$

$b) B=70.\left(\frac{131313}{565656}+\frac{131313}{727272}+\frac{131313}{909090}\right)$

$c) C=\frac{2a}{3b}.\frac{3b}{4c}.\frac{4c}{5d}.\frac{5d}{2a}$ biết $\frac{2a}{3b}=\frac{3b}{4c}=\frac{4c}{5d}=\frac{5d}{2a}$

Lời giải

$a) -1.1.(-1).....(-1).1.(-1)=-1$

$b) B=70.\left(\frac{13}{56}+\frac{13}{72}+\frac{13}{90}\right)=70.13.\left(\frac{1}{7.8}+\frac{1}{8.9}+\frac{1}{9.10}\right)=70.13.\left(\frac{1}{7}-\frac{1}{10}\right)=39$

c) Đặt $\frac{2a}{3b}=\frac{3b}{4c}=\frac{4c}{5d}=\frac{5d}{2a}=k$

Ta có: $\frac{2a}{3b}.\frac{3b}{4c}.\frac{4c}{5d}.\frac{5d}{2a}=k^4\Rightarrow k^4=1\Rightarrow k=\pm1\Rightarrow C=\pm4$

Câu 90. (Đề thi HSG 6 THCS Kim Trực- Kim Bài 2017-2018)

Cho $a,b,c,d\neq0$ biết $\frac{2a}{3b}=\frac{3b}{4c}=\frac{4c}{5d}=\frac{5d}{2a}$. Tính $C=\frac{2a}{3b}+\frac{3b}{4c}+\frac{4c}{5d}+\frac{5d}{2a}$

Lời giải

Đặt $\frac{2a}{3b}=\frac{3b}{4c}=\frac{4c}{5d}=\frac{5d}{2a}=k$

Ta có: $\frac{2a}{3b}.\frac{3b}{4c}.\frac{4c}{5d}.\frac{5d}{2a}=k^4\Rightarrow k^4=1\Rightarrow k=\pm1$

$\Rightarrow C=\frac{2a}{3b}+\frac{3b}{4c}+\frac{4c}{5d}+\frac{5d}{2a}=\pm4$

Câu 91. (Đề thi HSG 6 huyện Thủy Nguyên 2017-2018)

Tính nhanh

$A=3.136.8+4.14.6-14.150$

$B=\left(\frac{11}{4}.\frac{-5}{9}-\frac{4}{9}:\frac{4}{11}\right).\frac{8}{33}$

Lời giải

$A=24.136+24.14-14.150=24.(136+14)-14.150$

$=24.150-14.150=150.(24-14)=150.10=1500$

$B=\left(\frac{11}{4}.\frac{-5}{9}-\frac{4}{9}.\frac{11}{4}\right).\frac{8}{33}=\frac{11}{4}.\left(\frac{-5}{9}-\frac{4}{9}\right).\frac{8}{33}=-\frac{11}{4}.1.\frac{8}{33}=\frac{-2}{3}$

Câu 92. **(Đề thi HSG 6 huyện 2018 - 2019)**

Tính giá trị các biểu thức sau:

$a) A=(-1).(-1)^2.(-1)^3.(-1)^4.....(-1)^{2010}.(-1)^{2011}$

$b) B=70.\left(\frac{131313}{565656}+\frac{131313}{727272}+\frac{131313}{909090}\right)$

$c) C=\frac{2a}{3b}+\frac{3b}{4c}+\frac{4c}{5d}+\frac{5d}{2a}$ biết $\frac{2a}{3b}=\frac{3b}{4c}=\frac{4c}{5d}=\frac{5d}{2a}$

Lời giải

$a) -1.1.(-1).....(-1).1.(-1)=-1$

$b) B=70.\left(\frac{13}{56}+\frac{13}{72}+\frac{13}{90}\right)=70.13.\left(\frac{1}{7.8}+\frac{1}{8.9}+\frac{1}{9.10}\right)=70.13.\left(\frac{1}{7}-\frac{1}{10}\right)=39$

c) Đặt $\frac{2a}{3b}=\frac{3b}{4c}=\frac{4c}{5d}=\frac{5d}{2a}=k$

Ta có: $\frac{2a}{3b}.\frac{3b}{4c}.\frac{4c}{5d}.\frac{5d}{2a}=k^4\Rightarrow k^4=1\Rightarrow k=\pm1\Rightarrow C=\pm4$

Câu 93. **(Đề thi HSG 6 huyện Bá Thước 2018 - 2019)**

Tính: $a) 4.5^2-3.(24-9)$ $b) 7+6.\left(-\frac{1}{2}\right)^2$ $c) \frac{2^5.7+2^5}{2^5.5^2-2^5.3}$

Lời giải

$a) 55$ $b) \frac{17}{2}$ $c) \frac{2^5.(7+1)}{2^5.(25-3)}=\frac{8}{22}=\frac{4}{11}$

Câu 94. **(Đề thi HSG 6 huyện Thủy Nguyên 2018 - 2019)**

a. Rút gọn phân số sau: $\frac{2^3.3^3.5^3.7.8}{3.2^4.5^3.14}$

b. Tính $B=14:\left(4\frac{1}{12}-2\frac{5}{8}\right)+14.\frac{1}{4}.\frac{2}{3}$

Lời giải

a. Kết quả : 18

b. Kết quả : $11\frac{14}{15}$

Câu 95. **(Đề thi HSG 6 huyện Thủy Nguyên 20… - 20…)**

Thực hiện các phép tính sau một cách hợp lý

$a) \left(10^2+11^2+12^2\right):\left(13^2+14^2\right)$

$b) 1.2.3....2013-1.2.3....2012-1.2.3....2012^2$

$c) \left(\frac{5}{12}+1\frac{4}{3}-0,25\right):\frac{5}{8}+0,75$

Lời giải

$a)\ \left(10^2+11^2+12^2\right):\left(13^2+14^2\right)=\left(100+121+144\right):\left(169+196\right)=365:365=1$

$b)\ 1.2.3....2013-1.2.3....2012-1.2.3....2012^2=1.2.3....2012.\left(2013-1-2012\right)$

$=1.2.3....2012.0=0$

$c)\ \left(\frac{5}{12}+\frac{7}{3}-\frac{1}{4}\right):\frac{5}{8}+\frac{3}{4}=\frac{5+28-3}{12}.\frac{8}{5}+\frac{3}{4}=\frac{15}{6}.\frac{8}{4}+\frac{3}{4}=\frac{19}{4}$

Câu 96. (Đề thi HSG 6 huyện Thủy Nguyên 20… - 20…)

Tính nhanh:

$A=35.\left(34+86\right)+65.\left(75+45\right)$

$B=\frac{2\left(\frac{1}{5}-\frac{1}{9}+\frac{1}{11}\right)}{7.\left(\frac{1}{5}-\frac{1}{9}+\frac{1}{11}\right)}:\frac{2\left(\frac{1}{6}-\frac{1}{8}+\frac{1}{10}\right)}{7.\left(\frac{1}{6}-\frac{1}{8}+\frac{1}{10}\right)}$

Lời giải

$A=35.\left(34+86\right)+65.\left(75+45\right)=120.\left(35+65\right)=120.100=12000$

$B=\frac{2\left(\frac{1}{5}-\frac{1}{9}+\frac{1}{11}\right)}{7.\left(\frac{1}{5}-\frac{1}{9}+\frac{1}{11}\right)}:\frac{2\left(\frac{1}{6}-\frac{1}{8}+\frac{1}{10}\right)}{7.\left(\frac{1}{6}-\frac{1}{8}+\frac{1}{10}\right)}=\frac{2}{7}:\frac{2}{7}=1$

Câu 97. (Đề thi HSG 6 huyện Thuỷ Nguyên 2019-2020)

Thực hiện phép tính

$a)\left(1^2+2^2+3^2+.....+2012^2\right).\left(91-273:3\right)$

$b)\left(-284\right).172+\left(-284\right).\left(-72\right)$

$c)\frac{1}{5}+\frac{-1}{6}+\frac{1}{7}+\frac{-1}{8}+\frac{1}{9}+\frac{1}{8}+\frac{-1}{7}+\frac{1}{6}+\frac{-1}{5}$

Giải

$a)\left(1^2+2^2+3^2+.....+2012^2\right).0=0$

$b)\left(-284\right).\left(172-72\right)=-28400$

$c)\left(\frac{1}{5}+\frac{-1}{5}\right)+\left(\frac{1}{6}+\frac{-1}{6}\right)+\left(\frac{1}{7}+\frac{-1}{7}\right)+\left(\frac{1}{8}+\frac{-1}{8}\right)+\frac{1}{9}=\frac{1}{9}$

Câu 98. (Đề thi HSG 6 huyện Thuỷ Nguyên 2015-2016)

Thực hiện phép tính (tính nhanh nếu có thể)

$A=21.7^2-11.7^2+90.7^2+49.125.16$

Giải

$A=7^2.\left(21-11+90+125.16\right)=49.2100=102900$

Câu 99. (Đề thi HSG 6 huyện Thuỷ Nguyên)

Tính nhanh

$A = 6.4.57 + 12.29.2 + 3.14.8$

Giải

$A = 24.57 + 24.29 + 24.14 = 24.(57 + 29 + 14) = 24.100 = 2400$

Câu 100. (Đề thi HSG 6 Trường THCS Nguyễn Khuyến 2017-2018)

Tính giá trị biểu thức sau:

$B = \frac{2a}{5b} + \frac{5b}{6c} + \frac{6c}{7d} + \frac{7d}{2a}$ biết $\frac{2a}{5b} = \frac{5b}{6c} = \frac{6c}{7d} = \frac{7d}{2a}$ và $a;b;c;d \neq 0$

Giải

Đặt $\frac{2a}{5b} = \frac{5b}{6c} = \frac{6c}{7d} = \frac{7d}{2a} = k$

Ta có: $\frac{2a}{5b}.\frac{5b}{6c}.\frac{6c}{7d}.\frac{7d}{2a} = k^4 \Rightarrow k^4 \Rightarrow k = \pm 1$

$\Rightarrow C = \frac{2a}{5b} + \frac{5b}{6c} + \frac{6c}{7d} + \frac{7d}{2a} = \pm 4$

Câu 101. (Đề thi HSG 6 Năm 2019-2020)

Thực hiện các phép tính sau một cách hợp lý:

$a)\left(10^2 + 11^2 + 12^2\right) : \left(13^2 + 14^2\right)$

$b)\frac{\left(3.4.2^{16}\right)^2}{11.2^{13}.4^{11} - 16^9}$

$c)1152 - (374 + 1152) + (-65 + 374)$

Giải

$a)\left(10^2 + 11^2 + 12^2\right) : \left(13^2 + 14^2\right) = (100 + 121 + 144) : (169 + 196) = 365 : 365 = 1$

$b)\frac{\left(3.4.2^{16}\right)^2}{11.2^{13}.4^{11} - 16^9} = \frac{\left(3.2^2.2^{16}\right)^2}{11.2^{13}.\left(2^2\right)^{11} - \left(2^4\right)^9} = \frac{3^2.\left(2^{18}\right)^2}{11.2^{13}.2^{22} - 2^{36}}$

$= \frac{3^2.2^{36}}{11.2^{35} - 2^{36}} = \frac{3^2.2^{36}}{2^{35}.(11 - 2)} = \frac{3^2.2}{9} = 2$

$c)1152 - (374 + 1152) + (-65 + 374) = 1152 - 374 - 1152 + -65 + 374$

$= (1152 - 1152) + (374 - 374) - 65 = -65$

Câu 102. (Đề HSG Toán 6 huyện Tam Dương 2018-2019)

Cho $A=1-\frac{1}{2}+\frac{1}{3}-\frac{1}{4}+.....-\frac{1}{2012}$; $B=\frac{1}{1007}+\frac{1}{1008}+.....+\frac{1}{2012}$.

Tính $\left(\frac{A}{B}\right)^{2013}$

Lời giải

Ta có: $A=1-\frac{1}{2}+\frac{1}{3}-\frac{1}{4}+...-\frac{1}{2012}$

$=1+\frac{1}{2}+\frac{1}{3}+\frac{1}{4}+.....+\frac{1}{2012}-2\left(\frac{1}{2}+\frac{1}{4}+\frac{1}{6}+.....+\frac{1}{2012}\right)$

$=1+\frac{1}{2}+\frac{1}{3}+\frac{1}{4}+.....+\frac{1}{2012}-\left(1+\frac{1}{2}+\frac{1}{3}+\frac{1}{4}+.....+\frac{1}{1006}\right)$

$=\frac{1}{1007}+\frac{1}{1008}+.....+\frac{1}{2012}=B$

Suy ra: $\frac{A}{B}=1\Rightarrow\left(\frac{A}{B}\right)^{2013}=1^{2013}=1$ Vậy $\left(\frac{A}{B}\right)^{2013}=1$

Câu 103. (Đề HSG Toán 6_Tam Dương_2018-2019)

Thực hiện phép tính:

$a)S=\frac{3}{(1.2)^2}+\frac{5}{(2.3)^2}+.....+\frac{61}{(30.31)^2}$

$b)B=1\frac{6}{41}.\left(\frac{12+\frac{12}{19}-\frac{12}{37}-\frac{12}{53}}{3+\frac{3}{19}-\frac{3}{37}-\frac{3}{53}}:\frac{4+\frac{4}{15}+\frac{4}{4}+\frac{4}{2013}}{5+\frac{5}{15}+\frac{5}{4}+\frac{5}{2013}}\right).\frac{12424243}{237373735}$

Lời giải

Ta có: $\frac{2n+1}{\left[n(n+1)\right]^2}=\frac{1}{n^2}-\frac{1}{(n+1)^2}$; với $n\in\mathbb{N}*$

Do đó:

$S=\left(1-\frac{1}{2}\right)^2+\left(\frac{1}{2^2}-\frac{1}{3^2}\right)+.....+\left(\frac{1}{30^2}-\frac{1}{31^2}\right)=1-\frac{1}{31^2}=\frac{31^2-1}{31^2}=\frac{960}{961}$

a) Ta có:

$B=1\frac{6}{41}.\left(\frac{12+\frac{12}{19}-\frac{12}{37}-\frac{12}{53}}{3+\frac{3}{19}-\frac{3}{37}-\frac{3}{53}}:\frac{4+\frac{4}{15}+\frac{4}{4}+\frac{4}{2013}}{5+\frac{5}{15}+\frac{5}{4}+\frac{5}{2013}}\right).\frac{124242423}{237373735}$

$=\frac{47}{41}.\left[\frac{12.\left(1+\frac{1}{19}-\frac{1}{37}-\frac{1}{53}\right)}{3.\left(1+\frac{1}{19}-\frac{1}{37}-\frac{1}{53}\right)}:\frac{4\left(1+\frac{1}{15}+\frac{1}{4}+\frac{1}{2013}\right)}{5.\left(1+\frac{1}{15}+\frac{1}{4}+\frac{1}{2013}\right)}\right].\frac{41.3.1010101}{47.5.1010101}$

$= \frac{47}{41}.\left(4.\frac{5}{4}\right).\frac{41.3}{47.5} = 3$

Câu 104. (Đề HSG Toán 6 huyện Tam Đảo 2019-2020)

Tính $a) 4,32 + 0,08 + 0,02 + 0,53$ $b)\left(\frac{2}{3}+\frac{3}{4}+\frac{4}{5}+\frac{5}{6}\right).\left(\frac{1}{2}-\frac{1}{3}-\frac{1}{6}\right)$

Lời giải

$a) 4,32 + 0,08 + 0,02 + 0,53 = 4,95$

$b)\left(\frac{2}{3}+\frac{3}{4}+\frac{4}{5}+\frac{5}{6}\right).\left(\frac{1}{2}-\frac{1}{3}-\frac{1}{6}\right) = \left(\frac{2}{3}+\frac{3}{4}+\frac{4}{5}+\frac{5}{6}\right).0 = 0$

Câu 105. (Đề HSG Toán 6 huyện Nga Sơn 2018-2019)

Tính nhanh:

$a) \frac{7}{13}.\frac{7}{15} - \frac{5}{12}.\frac{21}{39} + \frac{49}{91}.\frac{8}{15}$ $b)\left(\frac{12}{199}+\frac{23}{200}-\frac{34}{201}\right).\left(\frac{1}{2}-\frac{1}{3}-\frac{1}{6}\right)$

Lời giải

$a) \frac{7}{13}.\frac{7}{15} - \frac{5}{12}.\frac{21}{39} + \frac{49}{91}.\frac{8}{15} = \frac{7}{13}.\frac{7}{15} - \frac{5}{12}.\frac{7}{13} + \frac{7}{13}.\frac{8}{15}$

$= \frac{7}{13}.\left(\frac{7}{15}-\frac{5}{12}+\frac{8}{15}\right) = \frac{7}{13}.\left(1-\frac{5}{12}\right) = \frac{7}{13}.\frac{7}{12} = \frac{49}{156}$

$b)\left(\frac{12}{199}+\frac{23}{200}-\frac{34}{201}\right).\left(\frac{1}{2}-\frac{1}{3}-\frac{1}{6}\right)$

$= \left(\frac{12}{199}+\frac{23}{200}-\frac{34}{201}\right).\left(\frac{3}{6}-\frac{2}{6}-\frac{1}{6}\right) = \left(\frac{12}{199}+\frac{23}{200}-\frac{34}{201}\right).0 = 0$

Câu 106. Đề HSG Toán 6 huyện 2018-2019

Chứng minh rằng:

$a) 1 - \frac{1}{2} + \frac{1}{3} - \frac{1}{4} + ... + \frac{1}{199} - \frac{1}{200} = \frac{1}{101} + \frac{1}{102} + ... + \frac{1}{200}$

$b) \frac{51}{2}.\frac{52}{2}.....\frac{100}{2} = 1.3.5....99$

Lời giải

$a)\ 1 - \frac{1}{2} + \frac{1}{3} - \frac{1}{4} + ... + \frac{1}{199} - \frac{1}{200}$

$= 1 + \frac{1}{3} + \frac{1}{5} + ... + \frac{1}{199} - \left(\frac{1}{2}+\frac{1}{4}+\frac{1}{6}+.....+\frac{1}{200}\right)$

$= 1 + \frac{1}{2} + \frac{1}{3} + \frac{1}{4} + \frac{1}{5} + \frac{1}{6} + ... + \frac{1}{199} + \frac{1}{200} - 2\left(\frac{1}{2}+\frac{1}{4}+\frac{1}{6}+.....+\frac{1}{200}\right)$

$= 1 + \frac{1}{2} + \frac{1}{3} + \frac{1}{4} + \frac{1}{5} + \frac{1}{6} + ... + \frac{1}{199} + \frac{1}{200} - \left(1+\frac{1}{2}+\frac{1}{3}+.....+\frac{1}{100}\right)$

$$= \frac{1}{101} + \frac{1}{102} + \frac{1}{103} + ... + \frac{1}{200}$$

b) Ta có:

$$1.3.5.....99 = \frac{(1.3.5.....99).(2.4.6....100)}{(2.4.6....100)} = \frac{1.2.3.....99.100}{(1.2).(2.2)....(2.50)}$$

$$= \frac{1.2.3.....99.100}{(1.2.3.....50).\underbrace{2.2.2.2.....2}_{50\,thua\,so\,2}} = \frac{51.52.53.....99.100}{\underbrace{2.2.2.....2}_{50\,thua\,so\,2}} = \frac{51}{2}.\frac{52}{2}.\frac{53}{2}.....\frac{100}{2}$$

Câu 107. (Đề HSG Toán 6 trường Liên Châu)

Chứng minh rằng: $1+\frac{1}{2}+\frac{1}{3}+.....+\frac{1}{2^{1999}} > 1000$

Lời giải

$$1+\frac{1}{2}+\frac{1}{3}+.....+\frac{1}{2^{1999}} = 1+\frac{1}{2}+\left(\frac{1}{3}+\frac{1}{2^2}\right)+\left(\frac{1}{5}+....+\frac{1}{2^3}\right)+.....+\left(\frac{1}{2^{1998}+1}+....+\frac{1}{2^{1999}}\right)$$

$$> 1+\frac{1}{2}+\frac{1}{2^2}.2+.....+\frac{1}{2^{1999}}.2^{1998} = 1+\frac{1}{2}.1999 = 1000,5 > 1000$$

Câu 108. (Đề HSG Toán 6 huyện Hải Hậu)

Tính (một cách hợp lý)

$a) 143.(57-36)-57.(143-36)$

$b) 24^4 : 3^4 - 32^{12} : 16^{12}$

Lời giải

$a) 143.(57-36)-57.(143-36)$

$= 143.57-143.36-143.57+57.36$

$= 36.(-143+57) = 36.(-96) = -3096$

$b) 24^4 : 3^4 - 32^{12} : 16^{12} = (8.3)^4 : 3^4 - (16.2)^{12} : 16^{12}$

$= 8^4 - 2^{12} = 2^{12} - 2^{12} = 0$

Câu 109. (Đề HSG Toán 6 huyện Anh Sơn)

Thực hiện phép tính

$a) -32.56-32.25-32.19$

$b) 2^4.5-\left[131-(13-4)^2\right]$

$c) \frac{9^3.25^3}{18^2.125^2}$

Lời giải

$a) -32.56-32.25-32.19 = -32.(56+25+19) = -32.100 = -3200$

$b) 2^4.5-\left[131-(13-4)^2\right] = 16.5-\left[131-9^2\right] = 80-[131-81] = 30$

$c) \frac{9^3.25^3}{18^2.125^2} = \frac{3^6.5^6}{2^2.3^4.5^6} = \frac{3^2}{2^2} = \frac{9}{4}$

Câu 110. (Đề HSG Toán 6 huyện Hoài Nhơn 2018-2019)

Thực hiện phép tính:

$$E=1+\frac{1}{2}(1+2)+\frac{1}{3}(1+2+3)+\frac{1}{4}(1+2+3+4)+....+\frac{1}{200}(1+2+3+....+200)$$

Lời giải

Ta có: $1+2+3+.....+n=\frac{n(n+1)}{2}$

nên $E=1+\frac{1}{2}(1+2)+\frac{1}{3}(1+2+3)+\frac{1}{4}(1+2+3+4)+....+\frac{1}{200}(1+2+3+....+200)$

$$=1+\frac{1}{2}.\frac{2.3}{2}+\frac{1}{3}.\frac{3.4}{2}+\frac{1}{4}.\frac{4.5}{2}+.....+\frac{1}{200}.\frac{200.201}{2}=1+\frac{3}{2}+\frac{4}{2}+\frac{5}{2}+....+\frac{201}{2}$$

Ta có: $E+\frac{1}{2}=\frac{1}{2}+\frac{2}{2}+\frac{3}{2}+\frac{4}{2}+\frac{5}{2}+....+\frac{201}{2}=\frac{1}{2}(1+2+4+.....+201)$

Hay $E=\frac{1}{2}(1+2+4+.....+201)-\frac{1}{2}=\frac{1}{2}.\frac{201.202}{2}-\frac{1}{2}=10150$

Vậy $E=10150$

Câu 111. (Đề HSG Toán 6 huyện Lâm Thao 2018-2019)

Tính giá trị biểu thức sau:

$$B=\left(2017-\frac{1}{4}-\frac{2}{5}-\frac{3}{6}-\frac{4}{7}-.....-\frac{2017}{2020}\right):\left(\frac{1}{20}+\frac{1}{25}+\frac{1}{30}+\frac{1}{35}+.....+\frac{1}{10100}\right)$$

Lời giải

Ta đặt: $X=2017-\frac{1}{4}-\frac{2}{5}-\frac{3}{6}-\frac{4}{7}-.....-\frac{2017}{2020}$

$$=-\left(\frac{1}{4}-1+\frac{2}{5}-1+\frac{3}{6}-1+\frac{4}{7}-1+...+\frac{2017}{2020}-1\right)$$

$$=-\left(\frac{-3}{4}+\frac{-3}{5}+\frac{-3}{6}+\frac{-3}{7}+....+\frac{-3}{2020}\right)=3\left(\frac{1}{4}+\frac{1}{5}+\frac{1}{6}+\frac{1}{7}+...+\frac{1}{2020}\right)$$

$$Y=\frac{1}{20}+\frac{1}{25}+\frac{1}{30}+\frac{1}{35}+.....+\frac{1}{10100}=\frac{1}{5}\left(\frac{1}{4}+\frac{1}{5}+\frac{1}{6}+\frac{1}{7}+...+\frac{1}{2020}\right)$$

Ta có $B=X:Y=3\left(\frac{1}{4}+\frac{1}{5}+\frac{1}{6}+\frac{1}{7}+...+\frac{1}{2020}\right):\frac{1}{5}\left(\frac{1}{4}+\frac{1}{5}+\frac{1}{6}+\frac{1}{7}+...+\frac{1}{2020}\right)=15$

Vậy $B=15$

Câu 112. (Đề HSG Toán 6 huyện 2018-2019)

Tính giá trị biểu thức:

$a) A=\frac{4}{7}+\frac{1}{7}.\frac{2}{3}-\frac{1}{7}.\frac{5}{2}$

$b) B=\left(1-\frac{1}{2}\right)\left(1-\frac{1}{3}\right)\left(1-\frac{1}{4}\right)\left(1-\frac{1}{5}\right).\left(1-\frac{1}{6}\right)$

$c) C=\left(1-\frac{1}{2}\right)\left(1-\frac{1}{3}\right)\left(1-\frac{1}{4}\right).....\left(1-\frac{1}{a+1}\right)(a\in\mathbb{N}*)$

Lời giải

$a) A=\frac{1}{7}\left(4+\frac{2}{3}-\frac{5}{2}\right)=\frac{1}{7}.\frac{13}{6}=\frac{13}{42}$

$b) B=\left(1-\frac{1}{2}\right)\left(1-\frac{1}{3}\right)\left(1-\frac{1}{4}\right)\left(1-\frac{1}{5}\right)\left(1-\frac{1}{6}\right)=\frac{1}{2}.\frac{2}{3}.\frac{3}{4}.\frac{4}{5}.\frac{5}{6}=\frac{1}{6}$

$c)\left(1-\frac{1}{2}\right)\left(1-\frac{1}{3}\right)\left(1-\frac{1}{4}\right).....\left(1-\frac{1}{a+1}\right)=\frac{1}{2}.\frac{2}{3}.\frac{3}{4}.....\frac{a-1}{a}.\frac{a}{a+1}=\frac{1}{a+1}$

Câu 113. (Đề HSG 6 Liên Châu năm 2018 – 2019)

Tính giá trị biểu thức

$$A=-1\frac{1}{5}.\frac{4.\left(3+\frac{1}{3}-\frac{3}{7}-\frac{3}{53}\right)}{3+\frac{1}{3}-\frac{3}{7}-\frac{3}{53}}:\frac{4+\frac{4}{17}+\frac{4}{19}+\frac{4}{2003}}{5+\frac{5}{17}+\frac{5}{19}+\frac{5}{2003}}$$

Lời giải

$$A=-1\frac{1}{5}.\frac{4\left(3+\frac{1}{3}-\frac{3}{7}-\frac{3}{53}\right)}{\left(3+\frac{1}{3}-\frac{3}{7}-\frac{3}{53}\right)}:\frac{4+\frac{4}{17}+\frac{4}{19}+\frac{4}{2003}}{5+\frac{5}{17}+\frac{5}{19}+\frac{5}{2003}}=-1\frac{1}{5}.4:\frac{4}{5}=-6$$

Câu 114. (Đề HSG Toán 6

Tính $A=\left[-2008.57+1004.(-86)\right]:\left[32.74+16.(-48)\right]$

Lời giải

$A=\left[-2008.57+1004.(-86)\right]:\left[32.74+16.(-48)\right]$

$=-125,5$

Câu 115. (Đề HSG 6 huyện Vĩnh Tường 2019 – 2020)

Rút gọn: $A=\frac{9^{14}.25^5.8^7}{18^{12}.625^3.24^3}$

Lời giải

$$A=\frac{9^{14}.25^5.8^7}{18^{12}.625^3.24^3}=\frac{9^{14}.5^{10}.8^7}{9^{12}.2^{12}.5^{12}.8^3.3^3}=\frac{3}{25}$$

Câu 116. (Đề HSG 6 Trường THCS Nghi Phú 2018 – 2019)

a) Rút gọn phân số sau: $\frac{2^3.3^3.5^3.7.8}{3.2^4.5^3.14}$

b) Tính $B=14:\left(4\frac{1}{12}-2\frac{5}{8}\right)+14.\frac{1}{4}.\frac{2}{3}$

Lời giải

a) $\frac{2^3.3^3.5^3.7.8}{3.2^4.5^3.14}=\frac{2^3.3^3.5^3.7.8}{3.2^4.5^3.2.7}=18$

b) $B=14:\left(4\frac{1}{12}-2\frac{5}{8}\right)+14.\frac{1}{4}.\frac{2}{3}=11\frac{14}{15}$

Câu 117. (Đề HSG Cấp Trường)

Tính giá trị của các biểu thức sau:

a) $2^4.5-\left[131-\left(13-4\right)^2\right]$

b) $\frac{-3}{5}+\frac{28.43}{5.56}+\frac{28.5}{5.24}-\frac{28.21}{5.63}$

Lời giải

$a)2^4.5-\left[131-\left(13-4\right)^2\right]=16.5-(131-9^2)=80-50=30$

$b)\frac{-3}{5}+\frac{28.43}{5.56}+\frac{28.5}{5.24}-\frac{28.21}{5.63}=-\frac{3}{5}+\frac{28}{5}.\left(\frac{129}{168}+\frac{35}{168}-\frac{56}{168}\right)$

$=-\frac{3}{5}+\frac{28}{5}.\frac{108}{168}=\frac{-3}{5}+\frac{18}{5}=3$

Câu 118. (Đề HSG Cấp Trường)

Tính giá trị của các biểu thức sau:

a) $\left(\frac{136}{15}-\frac{28}{5}+\frac{62}{10}\right).\frac{21}{24}$

b) $\left[528:\left(19,3-15,3\right)\right]+42\left(128+75-32\right)-7314$

c) $\frac{5}{6}+6\frac{5}{6}.\left(11\frac{5}{20}-9\frac{1}{4}\right):8\frac{1}{3}$

Lời giải

a) $\left(\frac{136}{15}-\frac{28}{5}+\frac{62}{10}\right).\frac{21}{24}=\left(\frac{272}{30}-\frac{168}{30}+\frac{186}{30}\right).\frac{21}{24}=\frac{29}{3}.\frac{7}{8}=\frac{203}{24}$

b) $\left[528:\left(19,3-15,3\right)\right]+42\left(128+75-32\right)-7314$

$=\left(528:4\right)+42.171-7314=132+7182-7314=0$

c) $\frac{5}{6}+6\frac{5}{6}.\left(11\frac{5}{20}-9\frac{1}{4}\right):8\frac{1}{3}$

$=\frac{5}{6}+\frac{41}{6}.\left(11\frac{1}{4}-9\frac{1}{4}\right):\frac{25}{3}=\frac{5}{6}+\frac{41}{6}.2.\frac{3}{25}=\frac{5}{6}+\frac{41}{25}=\frac{371}{150}$

$=1152-374-1152+-65+374$

$=\left(1152-1152\right)+\left(374-374\right)-65=-65$

Câu 119. (Đề HSG 6 năm 2019 – 2020)

Tính giá trị các biểu thức sau:

$a) B = 70.\left(\frac{131313}{565656}+\frac{131313}{727272}+\frac{131313}{909090}\right)$

$b) C = \frac{2a}{3b}+\frac{3b}{4c}+\frac{4c}{5d}+\frac{5d}{2a}$ biết $\frac{2a}{3b}=\frac{3b}{4c}=\frac{4c}{5d}=\frac{5d}{2a}$

Lời giải

$a) B = 70.\left(\frac{13}{56}+\frac{13}{72}+\frac{13}{90}\right)=70.13.\left(\frac{1}{7.8}+\frac{1}{8.9}+\frac{1}{9.10}\right)=70.13.\left(\frac{1}{7}-\frac{1}{10}\right)=39$

b) Đặt $\frac{2a}{3b}=\frac{3b}{4c}=\frac{4c}{5d}=\frac{5d}{2a}=k$

Ta có: $\frac{2a}{3b}.\frac{3b}{4c}.\frac{4c}{5d}.\frac{5d}{2a}=k^4 \Rightarrow k^4=1 \Rightarrow k=\pm 1 \Rightarrow C=\pm 4$

Câu 120. (Đề thi HSG 6 2018-2019)

a) Tính nhanh: $\frac{1978.1979+1980.21+1958}{1980.1979-1978.1979}$

b) Rút gọn $\frac{5^2.6^{11}.16^2+6^2.12^6.15^{12}}{2.6^{12}.10^4-81^2.960^3}$

Lời giải

a) $\frac{1978.1979+1980.21+1958}{1980.1979-1978.1979}=\frac{1978.1979+1979.21+21+1958}{1979.(1980-1978)}$

$=\frac{1979.(1978+21)+21+1958}{1979.2}=\frac{1979.(1978+21+1)}{1979.2}=\frac{1979.2000}{1979.2}=1000$

b) $\frac{5^2.6^{11}.16^2+6^2.12^6.15^2}{2.6^{12}.10^4-81^2.960^3}=\frac{5^2.(2.3)^{11}.(2^4)^2+(2.3)^2.(2^2.3)^6.(3.5)^5}{2.(2.3)^{12}.(2.5)^{14}-(3^4)^2.(2^6.3.5)^3}$

$=\frac{5^2.2^{19}.3^{11}+2^{14}.3^{10}.5^3}{2^{17}.5^4.3^{12}-3^{11}.2^{18}.5^3}=\frac{5^2.3^{10}.2^{14}.(2^5.3+5)}{2^{17}.5^3.3^{11}.(5.3-2)}=\frac{2^5.3+5}{2^3.5.3.12}=\frac{101}{1440}$

Câu 121. (Đề thi HSG 6 2019-2020)

Tính giá trị của các biểu thức sau:

a) $2^4.5-\left[131-(13-4)^2\right]$

b) $\frac{-3}{5}+\frac{28.43}{5.56}+\frac{28.5}{5.24}-\frac{28.21}{5.63}$

Lời giải

a) $16.5-(131-9^2)=80-50=30$

b) $\frac{-3}{5}+\frac{28}{5}.\left(\frac{43}{56}+\frac{5}{24}-\frac{1}{3}\right)=-\frac{3}{5}+\frac{28}{5}.\left(\frac{129}{168}+\frac{35}{168}-\frac{56}{168}\right)$

$=-\frac{3}{5}+\frac{28}{5}.\frac{108}{168}=\frac{-3}{5}+\frac{18}{5}=3$

Câu 122. (Đề thi HSG 6 2019-2020)

Thực hiện phép tính

a) $\left(\frac{136}{15}-\frac{28}{5}+\frac{62}{10}\right).\frac{21}{24}$

b) $\left[528:(19,3-15,3)\right]+42(128+75-32)-7314$

c) $\frac{5}{6}+6\frac{5}{6}.\left(11\frac{5}{20}-9\frac{1}{4}\right):8\frac{1}{3}$

Lời giải

a) $\left(\frac{272}{30}-\frac{168}{30}+\frac{186}{30}\right).\frac{21}{24}=\frac{29}{3}.\frac{7}{8}=\frac{203}{24}$

b) $(528:4)+42.171-7314=132+7182-7314=0$

c) $\frac{5}{6}+\frac{41}{6}.\left(11\frac{1}{4}-9\frac{1}{4}\right):\frac{25}{3}=\frac{5}{6}+\frac{41}{6}.2.\frac{3}{25}=\frac{5}{6}+\frac{41}{25}=\frac{371}{150}$

Câu 123. (Đề thi HSG 6 2018-2019)

Thực hiện các phép tính sau:

a) $\frac{2181.729+243.81.27}{3^2.9^2.234+18.54.162.9+723.729}$

b) $\frac{1}{1.2}+\frac{1}{2.3}+\frac{1}{3.4}+.....+\frac{1}{98.99}+\frac{1}{99.100}$

c) $\frac{1}{2^2}+\frac{1}{3^2}+\frac{1}{4^2}+.....+\frac{1}{100^2}<1$

d) $\frac{5.4^{15}-9^9-4.3^{20}.8^9}{5.2^9.6^{19}-7.2^{29}.27^6}$

Lời giải

a) $\frac{2181.729+243.81.27}{3^2.9^2.243+9^3.2.6.162+723.729}=\frac{2181.729+729^2}{729.243+729.1944+723.729}$

$=\frac{729.(2181+729)}{729.(243+1944+723)}=\frac{729.2910}{729.2910}=1$

b) $\frac{1}{1.2}+\frac{1}{2.3}+\frac{1}{3.4}+.....+\frac{1}{98.99}+\frac{1}{99.100}$

$=1-\frac{1}{2}+\frac{1}{2}-\frac{1}{3}+.....+\frac{1}{99}-\frac{1}{100}=1-\frac{1}{100}=\frac{99}{100}$

c) $\frac{1}{2^2}+\frac{1}{3^2}+\frac{1}{4^2}+...+\frac{1}{100^2}<\frac{1}{1.2}+\frac{1}{2.3}+\frac{1}{3.4}+...+\frac{1}{98.99}+\frac{1}{99.100}=\frac{99}{100}<1$

d) $\frac{5.4^{15}-9^9-4.3^{20}.8^9}{5.2^9.6^{19}-7.2^{29}.27^6}=\frac{2^{29}.3^{18}.(5.2-3)}{2^{28}.3^{18}.(5.3-7.2)}=2$

Câu 124. (Đề thi HSG 6 huyện Việt Yên 2019-2020)

Tính:

a) $A=1+2-3-4+5+6-7-8+9+.....+2013+2014-2015-2016$

b) $B=\frac{2.4.10+4.6.8+14.16.20}{3.6.15+6.9.12+21.24.30}$

Lời giải

a) $A=1+2-3-4+5+6-7-8+9+....+2013+2014-2015-2016$

Tính được số số hạng của A là: $(2016-1):1+1=2016$ (số hạng)

Nhóm 4 số hạng liên tiếp vào 1 nhóm:

$A=(1+2-3-4)+(5+6-7-8)+....+(2013+2014-2015-2016)$

$=\underbrace{-4+(-4)+.....+(-4)}_{co504so}=-4.504=-2016$

Vậy $A=-2016$

$B=\dfrac{2.4.10+4.6.8+14.16.20}{3.6.5+6.9.12+21.24.30}=\dfrac{8.(1.2.5+2.3.4+7.8.10)}{27.(1.2.5+2.3.4+7.8.10)}=\dfrac{8}{27}$

Vậy $B=\dfrac{8}{27}$

Câu 125. (Đề thi HSG 6 THCS Xuân Dương 2019-2020)

Tính nhanh $A=3.136.8+4.14.6-14.150$ và $B=\left(\dfrac{11}{4}.\dfrac{-5}{9}-\dfrac{4}{9}:\dfrac{4}{11}\right).\dfrac{8}{33}$

Lời giải

$A=24.136+24.14-14.150=24.(136+14)-14.150$

$=24.150-14.150=150.(24-14)=150.10=1500$

$B=\left(\dfrac{11}{4}.\dfrac{-5}{9}-\dfrac{4}{9}.\dfrac{11}{4}\right).\dfrac{8}{33}=\dfrac{11}{4}.\left(\dfrac{-5}{9}-\dfrac{4}{9}\right).\dfrac{8}{33}=\dfrac{11}{4}.1.\dfrac{8}{33}=\dfrac{2}{3}$

Câu 126. (Đề thi HSG 6 huyện Thanh Mai 2019-2020)

Tính nhanh: $A=\dfrac{1.5.6+2.10.12+4.20.24+9.45.54}{1.3.5+2.6.10+4.12.20+9.27.45}$

Lời giải

$A=\dfrac{1.5.6+2.10.12+4.20.24+9.45.54}{1.3.5+2.6.10+4.12.20+9.27.45}=\dfrac{2.(1.3.5+2.6.10+4.12.20+9.27.45)}{1.3.5+2.6.10+4.12.20+9.27.45}=\dfrac{1}{2}$

Câu 127. (Đề thi HSG 6 THCS Phương Trung 2018-2019)

Tính $\dfrac{5.4^{15}.9^9-4.3^{20}.8^9}{5.2^9.6^{19}-7.2^{29}.27^6}$

Lời giải

$\dfrac{5.2^{30}.3^{18}-2^2.3^{20}.2^{27}}{5.2^9.2^{19}.3^{19}-7.2^{29}.3^{18}}=\dfrac{2^{29}.3^{18}.(5.2-3^2)}{2^{28}.3^{18}.(5.3-7.2)}=2$

Câu 128. (Đề thi HSG 6 THCS Anh Sơn 2018-2019)

Thực hiện phép tính:

$a)\ -32.56-32.25-32.19$

$b)\ 2^4.5-\left[131-(13-4)^2\right]$

$c)\ \dfrac{9^3.25^3}{18^2.125^2}$

Lời giải

$a)\ -32.56-32.25-32.19=-32.(56+25+19)=-32.100=-3200$

b) $2^4.5-\left[131-\left(13-4\right)^2\right]=16.5-\left[131-9^2\right]=80-\left[131-81\right]=30$

c) $\dfrac{9^3.25^3}{18^2.125^2}=\dfrac{3^6.5^6}{2^2.3^4.5^6}=\dfrac{3^2}{2^2}=\dfrac{9}{4}$

Câu 129. (Đề thi HSG 6 huyện 2018-2019)

Thực hiện tính:

a) $A=1+\dfrac{1}{2}\left(1+2\right)+\dfrac{1}{3}\left(1+2+3\right)+.....+\dfrac{1}{2013}.\left(1+2+....+2013\right)$

b) $B=\dfrac{1-3}{1.3}+\dfrac{2-4}{2.4}+\dfrac{3-5}{3.5}+\dfrac{4-6}{4.6}+....+\dfrac{2011-2013}{2011.2013}+\dfrac{2012-2014}{2012.2014}-\dfrac{2013.2014}{2013.2014}$

Lời giải

a) $1+2+3+....+n=\dfrac{n\left(n+1\right)}{2}$

$\Rightarrow \quad A=1+\dfrac{1}{2}.\dfrac{2.3}{2}+\dfrac{1}{3}.\dfrac{3.4}{2}+.....+\dfrac{1}{2013}.\dfrac{2013.2014}{2}=1+\dfrac{3}{2}+\dfrac{4}{2}+.....+\dfrac{2014}{2}$

$A+\dfrac{1}{2}=\dfrac{1}{2}+\dfrac{2}{2}+\dfrac{3}{2}+.....+\dfrac{2014}{2}=\dfrac{1}{2}.\left(1+2+3+.....+2014\right)$

$A=\dfrac{1}{2}.\left(1+2+3+.....+2014\right)-\dfrac{1}{2}=1014552$

b) $B=-2\left(\dfrac{1}{1.3}+\dfrac{1}{3.5}+....+\dfrac{1}{2011.2013}+\dfrac{1}{2.4}+\dfrac{1}{4.6}+.....+\dfrac{1}{2012.2014}\right)-\dfrac{1}{2013}-\dfrac{1}{2014}$

$Thay:\begin{cases}\dfrac{1}{1.3}=\dfrac{1}{2}\left(\dfrac{1}{1}-\dfrac{1}{3}\right);\dfrac{1}{3.5}=\dfrac{1}{2}\left(\dfrac{1}{3}-\dfrac{1}{5}\right);.....;\dfrac{1}{2011.2013}=\dfrac{1}{2}\left(\dfrac{1}{2011}-\dfrac{1}{2013}\right)\\ \dfrac{1}{2.4}=\dfrac{1}{2}\left(\dfrac{1}{2}-\dfrac{1}{4}\right);\dfrac{1}{4.6}=\dfrac{1}{2}\left(\dfrac{1}{4}-\dfrac{1}{6}\right);.....;\dfrac{1}{2012.2014}=\dfrac{1}{2}\left(\dfrac{1}{2012}-\dfrac{1}{2014}\right)\end{cases}$

$\Rightarrow B=-\left(1-\dfrac{1}{3}+\dfrac{1}{3}-\dfrac{1}{5}+.....+\dfrac{1}{2011}-\dfrac{1}{2013}+\dfrac{1}{2}-\dfrac{1}{4}+.....+\dfrac{1}{2012}-\dfrac{1}{2014}\right)-\dfrac{1}{2013}-\dfrac{1}{2014}$

$B=-\dfrac{3}{2}$

Câu 130. (Đề thi HSG 6 huyện 2018-2019)

a) Rút gọn $A=\dfrac{7.9+14.27+21.36}{21.27+42.81+63.108}$

b) Tính $B=\dfrac{10}{56}+\dfrac{10}{140}+\dfrac{10}{260}+.....+\dfrac{10}{1400}$

Lời giải

a) $A=\dfrac{7.9+14.27+21.36}{21.27+42.81+63.108}=\dfrac{7.9.\left(1+2.3+3.4\right)}{21.27.\left(1+2.3+3.4\right)}=\dfrac{7.9}{21.27}=\dfrac{1}{9}$

b) $B=\frac{10}{56}+\frac{10}{140}+\frac{10}{260}+.....+\frac{10}{1400}$

$=\frac{5}{28}+\frac{5}{70}+\frac{5}{130}+.....+\frac{5}{700}=\frac{5}{4.7}+\frac{5}{7.10}+\frac{5}{10.13}+.....+\frac{5}{25.28}$

$=\frac{5}{3}.\left(\frac{3}{4.7}+\frac{3}{7.10}+\frac{3}{10.13}+.....+\frac{3}{25.28}\right)$

$=\frac{5}{3}.\left(\frac{1}{4}-\frac{1}{7}+\frac{1}{7}-\frac{1}{10}+\frac{1}{10}-\frac{1}{13}+.....+\frac{1}{25}-\frac{1}{28}\right)$

$=\frac{5}{3}.\left(\frac{1}{4}-\frac{1}{28}\right)=\frac{5}{3}.\frac{6}{28}=\frac{5}{14}$

Câu 131. (Đề thi HSG 6 huyện Bình Thuận 2018-2019)

a) Tính giá trị của biểu thức $A=\frac{1}{31}.\left[\frac{31}{5}.\left(9-\frac{1}{2}\right)-\frac{17}{2}.\left(4+\frac{1}{5}\right)\right]+\frac{1}{2}+\frac{1}{6}+\frac{1}{12}+.....+\frac{1}{930}$

b) Tính giá tri của biểu thức B biết: $B^2=c.(a-b)-b(a-c)$ và $a=-50, b-c=2$

Lời giải

$a) A=\frac{1}{31}.\left[\frac{31}{5}\left(9-\frac{1}{2}\right)-\frac{17}{2}.\left(4+\frac{1}{5}\right)\right]+\frac{1}{2}+\frac{1}{6}+\frac{1}{12}+....+\frac{1}{930}$

$M=\frac{1}{31}.\left[\frac{31}{5}\left(9-\frac{1}{2}\right)-\frac{17}{2}.\left(4+\frac{1}{5}\right)\right]=\frac{1}{31}.\left(\frac{31}{5}.\frac{17}{2}-\frac{17}{2}.\frac{21}{5}\right)=\frac{17}{31}.\left(\frac{31-21}{10}\right)=\frac{17}{31}$

$N=\frac{1}{2}+\frac{1}{6}+\frac{1}{12}+.....+\frac{1}{930}=\frac{1}{1.2}+\frac{1}{2.3}+.....+\frac{1}{30.31}$

$=1-\frac{1}{2}+\frac{1}{2}-\frac{1}{3}+.....+\frac{1}{30}-\frac{1}{31}=1-\frac{1}{31}=\frac{30}{31}$

$A=M+N=\frac{17}{31}+\frac{30}{31}=\frac{47}{31}$

b) $B^2=c.(a-b)-b(a-c)=ca-cb-ba+bc=ca-ba=a(c-b)$

thay $a=-50; b-c=2\Rightarrow B^2=-50.(-2)=100\Rightarrow B=10$

Câu 132. (Đề thi HSG 6 huyện Hoằng Hóa 2018-2019)

Tính giá trị của các biểu thức:

$a) A=-37+54+(-70)+(-163)+246$

$b) B=125.(-61).(-2)^3.(-1)^{2n}\ (n\in\mathbb{N}^*)$

$c) 1+2-3-4+5+6-7-.....+2014-2015-2016+2017+2018$

$d) D=\frac{3^2}{2.5}+\frac{3^2}{5.8}+\frac{3^2}{8.11}+\frac{3^2}{11.14}+\frac{3^2}{14.17}$

Lời giải

$A=-37+54+(-70)+(-163)+246=(54+246)+\left[(-37)+(-163)\right]+(-70)$

$=300+(-200)+(-70)=30$

$B=125.(-61).(-2)^3.(-1)^{2a}=125.8.61.1=61000$

$C=1+2-3-4+5+6-7-.....+2014-2015-2016+2017+2018$

$=1+(2-3-4+5)+(6-7-8+9)+.....+(2014-2015-2016+2017)+2018$

$=1+2018=2019$

$D=\frac{3^2}{2.5}+\frac{3^2}{5.8}+\frac{3^2}{8.11}+\frac{3^2}{11.14}+\frac{3^2}{14.17}=3.\left(\frac{1}{2}-\frac{1}{5}+\frac{1}{5}-\frac{1}{8}+.....+\frac{1}{14}-\frac{1}{17}\right)=3.\frac{15}{34}=\frac{45}{34}$

Câu 133. (Đề thi HSG 6 huyện Thanh Mai 2019-2020)

a) Tính nhanh: $A=\frac{1.5.6+2.10.12+4.20.24+9.45.54}{1.3.5+2.6.10+4.12.20+9.27.45}$

b) Cho $A=3^1+3^2+3^3+....+3^{2006}$. Tìm x để $2A+3=3^x$

Lời giải

$a)\ A=\frac{1.5.6+2.10.12+4.20.24+9.45.54}{1.3.5+2.6.10+4.12.20+9.27.45}=\frac{2.(1.3.5+2.6.10+4.12.20+9.27.45)}{1.3.5+2.6.10+4.12.20+9.27.45}=\frac{1}{2}$

$b)3A=3^2+3^3+.....+3^{2007}\Rightarrow 3A-A=3^{2007}-3\Rightarrow 2A=3^{2007}-3$

$2A+3=3^{2007}-3+3=3^{2007}=3^x\Rightarrow x=2007$

Câu 134. (Đề thi HSG 6 huyện 2018-2019)

Cho $A=5^{50}-5^{48}+5^{46}-5^{44}+.....+5^6-5^4+5^2-1$

a) Tính A

b) Tìm số tự nhiên n biết $26A+1=5^n$

c) Tìm số dư trong phép chia A cho 100.

Lời giải

$a)\ A=5^{50}-5^{48}+5^{46}-5^{44}+....+5^6-5^4+5^2-1$

$\Rightarrow 25A=5^2.\left(5^{50}-5^{48}+5^{46}-5^{44}+....+5^6-5^4+5^2-1\right)$

$=5^{52}-5^{50}+5^{48}-5^{46}+.....+5^8-5^6+5^4-5^2$

$\Rightarrow 25A+A=5^{52}-1\Rightarrow A=\frac{5^{52}-1}{26}$

b) Ta có: $26A+1=5^n$ mà $26A=5^{52}-1$ nên $5^{52}-1+1=5^n\Rightarrow n=52$

c) $A=5^{50}-5^{48}+5^{46}-5^{44}+.....+5^6-5^4+5^2-1$ (có 26 số hạng)

$=\left(5^{50}-5^{48}\right)+\left(5^{46}-5^{44}\right)+....+\left(5^6-5^4\right)+\left(5^2-1\right)$

$=5^{48}.\left(5^2-1\right)+5^{44}.\left(5^2-1\right)+....+5^4.\left(5^2-1\right)+\left(5^2-1\right)$

$=5^{48}.24+5^{44}.24+.....+5^4.24+24$

$=5^{46}.25.24+5^{42}.25.24+.....+5^2.25.24+24$

$=6.100.\left(5^{46}+5^{42}+.....+5^2\right)+24$

Suy ra A chia cho 100 dư 24.

Câu 135. (Đề thi HSG 6 huyện Lâm Thao 2019-2020)

Tính giá trị biểu thức sau:

$B=\left(2017-\frac{1}{4}-\frac{2}{5}-\frac{3}{6}-\frac{4}{7}-.....-\frac{2017}{2020}\right):\left(\frac{1}{20}+\frac{1}{25}+\frac{1}{30}+\frac{1}{35}+.....+\frac{1}{10100}\right)$

Lời giải

$B=\left(2017-\frac{1}{4}-\frac{2}{5}-\frac{3}{6}-\frac{4}{7}-....-\frac{2017}{2020}\right):\left(\frac{1}{20}+\frac{1}{25}+\frac{1}{30}+\frac{1}{35}+...+\frac{1}{10100}\right)$

$\left(2017-\frac{1}{4}-\frac{2}{5}-\frac{3}{6}-\frac{4}{7}-....-\frac{2017}{2020}\right)=\left[(1+1+1+...+1)+\left(-\frac{1}{4}-\frac{2}{5}-\frac{3}{6}-\frac{4}{7}-....-\frac{2017}{2020}\right)\right]$

$=\left(1-\frac{1}{4}\right)+\left(1-\frac{2}{5}\right)+\left(1-\frac{3}{6}\right)+\left(1-\frac{4}{7}\right)+...+\left(1-\frac{2017}{2020}\right)=\frac{3}{4}+\frac{3}{5}+\frac{3}{6}+\frac{3}{7}+...+\frac{3}{2020}$

$=3.\left(\frac{1}{4}+\frac{1}{5}+\frac{1}{6}+\frac{1}{7}+...+\frac{1}{2020}\right)$

$\frac{1}{20}+\frac{1}{25}+\frac{1}{30}+\frac{1}{35}+...+\frac{1}{10100}=\frac{1}{4.5}+\frac{1}{5.5}+\frac{1}{5.6}+\frac{1}{5.7}+...+\frac{1}{5.2020}$

$=\frac{1}{5}.\left(\frac{1}{4}+\frac{1}{5}+\frac{1}{6}+\frac{1}{7}+...+\frac{1}{2020}\right)$

Vậy $B=\left(2017-\frac{1}{4}-\frac{2}{5}-\frac{3}{6}-\frac{4}{7}-....-\frac{2017}{2020}\right):\left(\frac{1}{20}+\frac{1}{25}+\frac{1}{30}+\frac{1}{35}+...+\frac{1}{10100}\right)$

$=\frac{3.\left(\frac{1}{4}+\frac{1}{5}+\frac{1}{6}+\frac{1}{7}+...+\frac{1}{2020}\right)}{\frac{1}{5}.\left(\frac{1}{4}+\frac{1}{5}+\frac{1}{6}+\frac{1}{7}+...+\frac{1}{2020}\right)}=15$

Câu 136. (Đề thi HSG 6 huyện Thạch Thành 2018-2019)

Tìm các số tự nhiên a,b thỏa mãn: $(100a+3b+1)\left(2^a+10a+b\right)=225$

Lời giải

Ta có: $(100a+3b+1)\left(2^a+10a+b\right)=225$ (1)

Vì 225 lẻ nên $\begin{cases}100a+3b+1\\2^a+10a+b\end{cases}$ cùng lẻ (2)

*) Với $a=0$:

$(1)\Leftrightarrow(100.0+3b+1)\left(2^0+10.0+b\right)=225\Rightarrow(3b+1)(1+b)=225=3^2.5^2$

Vì $3b+1$chia cho 3 dư 1 và $3b+1>1+b$ nên $(3b+1)(1+b)=25.9\Rightarrow\begin{cases}3b+1=25\\1+b=9\end{cases}\Leftrightarrow b=8$

*)Với a là số tự nhiên khác 0: Khi đó $100a$ chẵn, từ $(2)\Rightarrow 3b+1$lẻ$\Rightarrow b$ chẵn

$\Rightarrow 2^a+10a+b$ chẵn, trái với (2) nên $b\in\varnothing$. Vậy $a=0;b=8$

Câu 137. (Đề thi HSG 6 huyện Thạch Thành 2018-2019)

Tính giá trị các biểu thức sau:

$a)\ A=68.74+27.68-68$

$b)\ B=2^3.5^3-3\left\{539-\left[639-8.\left(7^8:7^6+2017^0\right)\right]\right\}$

$c)\ C=\left(\frac{151515}{161616}+\frac{17^9}{17^{10}}\right)-\left(\frac{1500}{1600}-\frac{1616}{1717}\right)$

$d)\ D=\left(\frac{1}{2^2}-1\right)\left(\frac{1}{3^2}-1\right)\left(\frac{1}{4^2}-1\right).....\left(\frac{1}{100^2}-1\right)$

Lời giải

$a)\ A=68.74+27.68-68=68.\left(74+27-1\right)=68.100=6800$

$b)\ B=2^3.5^3-3\left\{539-\left[639-8.\left(7^8:7^6+2017^0\right)\right]\right\}=8.125-3.\left\{539-\left[639-8.\left(7^2+1\right)\right]\right\}$

$=1000-3.\left\{539-\left[639+8.50\right]\right\}=1000-3.300=1000-900=100$

$c)\ C=\left(\frac{151515}{161616}+\frac{17^9}{17^{10}}\right)-\left(\frac{1500}{1600}-\frac{1616}{1717}\right)=\left(\frac{15}{16}+\frac{1}{17}\right)-\left(\frac{15}{16}-\frac{16}{17}\right)$

$=\left(\frac{15}{16}-\frac{15}{16}\right)+\left(\frac{1}{17}+\frac{16}{17}\right)=0+1=1$

$d)\ D=\left(\frac{1}{2^2}-1\right)\left(\frac{1}{3^2}-1\right)\left(\frac{1}{4^2}-1\right).....\left(\frac{1}{100^2}-1\right)=\left(\frac{1-4}{2^2}\right)\left(\frac{1-9}{3^2}\right).....\left(\frac{1-1000}{100^2}\right)$

$=\frac{-3}{2^2}.\frac{-8}{3^2}.\frac{-15}{4^2}.....\frac{-9999}{100^2}=-\frac{1.3}{2.3}.\frac{2.4}{3.3.}.\frac{3.5}{4.4}.....\frac{99.1010}{100.100}$

$=-\frac{\left(1.2.3.....99\right).\left(3.4.5.....101\right)}{\left(2.3.4.....100\right).\left(2.3.4.....100\right)}=-\frac{101}{200}$

Câu 138. (Đề thi HSG 6 huyện Tam Dương 2018-2019)

Thực hiện phép tính:

$a)\ S=\frac{3}{\left(1.2\right)^2}+\frac{5}{\left(2.3\right)^2}+.....+\frac{61}{\left(30.31\right)^2}$

$b)\ B=1\frac{6}{41}.\left(\frac{12+\frac{12}{19}-\frac{12}{37}-\frac{12}{53}}{3+\frac{3}{19}-\frac{3}{37}-\frac{3}{53}}:\frac{4+\frac{4}{15}+\frac{4}{4}+\frac{4}{2013}}{5+\frac{5}{15}+\frac{5}{4}+\frac{5}{2013}}\right).\frac{12424243}{237373735}$

Lời giải

a) Ta có : $\frac{2n+1}{\left[n\left(n+1\right)\right]^2}=\frac{1}{n^2}-\frac{1}{\left(n+1\right)^2};$ với $n\in\mathbb{N}*$

Do đó : $S=\left(1-\frac{1}{2}\right)^2+\left(\frac{1}{2^2}-\frac{1}{3^2}\right)+.....+\left(\frac{1}{30^2}-\frac{1}{31^2}\right)=1-\frac{1}{31^2}=\frac{31^2-1}{31^2}=\frac{960}{961}$

b) Ta có:

$B=1\frac{6}{41}.\left(\frac{12+\frac{12}{19}-\frac{12}{37}-\frac{12}{53}}{3+\frac{3}{19}-\frac{3}{37}-\frac{3}{53}}:\frac{4+\frac{4}{15}+\frac{4}{4}+\frac{4}{2013}}{5+\frac{5}{15}+\frac{5}{4}+\frac{5}{2013}}\right).\frac{124242423}{237373735}$

$=\frac{47}{41}.\left[\frac{12.\left(1+\frac{1}{19}-\frac{1}{37}-\frac{1}{53}\right)}{3.\left(1+\frac{1}{19}-\frac{1}{37}-\frac{1}{53}\right)}:\frac{4\left(1+\frac{1}{15}+\frac{1}{4}+\frac{1}{2013}\right)}{5.\left(1+\frac{1}{15}+\frac{1}{4}+\frac{1}{2013}\right)}\right].\frac{41.3.1010101}{47.5.1010101}$

$=\frac{47}{41}.\left(4.\frac{5}{4}\right).\frac{41.3}{47.5}=3$

Câu 139. (Đề thi HSG 6 huyện tam Dương 2018-2019)

Cho $A=1-\frac{1}{2}+\frac{1}{3}-\frac{1}{4}+.....-\frac{1}{2012};B=\frac{1}{1007}+\frac{1}{1008}+.....+\frac{1}{2012}$. Tính $\left(\frac{A}{B}\right)^{2013}$

Lời giải

Ta có: $A=1-\frac{1}{2}+\frac{1}{3}-\frac{1}{4}+...-\frac{1}{2012}=1+\frac{1}{2}+\frac{1}{3}+\frac{1}{4}+.....+\frac{1}{2012}-2\left(\frac{1}{2}+\frac{1}{4}+\frac{1}{6}+.....+\frac{1}{2012}\right)$

$=1+\frac{1}{2}+\frac{1}{3}+\frac{1}{4}+.....+\frac{1}{2012}-\left(1+\frac{1}{2}+\frac{1}{3}+\frac{1}{4}+.....+\frac{1}{1006}\right)=\frac{1}{1007}+\frac{1}{1008}+.....+\frac{1}{2012}=B$

Suy ra: $\frac{A}{B}=1\Rightarrow\left(\frac{A}{B}\right)^{2013}=1^{2013}=1$

Vậy $\left(\frac{A}{B}\right)^{2013}=1$

Câu 140. (Đề thi HSG 6 huyện Hoài Nhơn 2018-2019)

Thực hiện phép tính:

$E=1+\frac{1}{2}(1+2)+\frac{1}{3}(1+2+3)+\frac{1}{4}(1+2+3+4)+....+\frac{1}{200}(1+2+3+....+200)$

Lời giải

Ta có: $1+2+3+.....+n=\frac{n(n+1)}{2}$

nên $E=1+\frac{1}{2}(1+2)+\frac{1}{3}(1+2+3)+\frac{1}{4}(1+2+3+4)+....+\frac{1}{200}(1+2+3+....+200)$

$=1+\frac{1}{2}.\frac{2.3}{2}+\frac{1}{3}.\frac{3.4}{2}+\frac{1}{4}.\frac{4.5}{2}+.....+\frac{1}{200}.\frac{200.201}{2}$

$=1+\frac{3}{2}+\frac{4}{2}+\frac{5}{2}+....+\frac{201}{2}$

Ta có: $E+\frac{1}{2}=\frac{1}{2}+\frac{2}{2}+\frac{3}{2}+\frac{4}{2}+\frac{5}{2}+....+\frac{201}{2}=\frac{1}{2}(1+2+4+.....+201)$

Hay $E=\frac{1}{2}(1+2+4+.....+201)-\frac{1}{2}=\frac{1}{2}.\frac{201.202}{2}-\frac{1}{2}=10150$

Vậy $E=10150$

Câu 141. (Đề thi HSG 6 huyện Lâm Thao 2018-2019)

Tính giá trị biểu thức sau:

$B=\left(2017-\frac{1}{4}-\frac{2}{5}-\frac{3}{6}-\frac{4}{7}-.....-\frac{2017}{2020}\right):\left(\frac{1}{20}+\frac{1}{25}+\frac{1}{30}+\frac{1}{35}+.....+\frac{1}{10100}\right)$

Lời giải

Ta đặt: $X=2017-\frac{1}{4}-\frac{2}{5}-\frac{3}{6}-\frac{4}{7}-.....-\frac{2017}{2020}$

$$=-\left(\frac{1}{4}-1+\frac{2}{5}-1+\frac{3}{6}-1+\frac{4}{7}-1+...+\frac{2017}{2020}-1\right)$$

$$=-\left(\frac{-3}{4}+\frac{-3}{5}+\frac{-3}{6}+\frac{-3}{7}+....+\frac{-3}{2020}\right)=3\left(\frac{1}{4}+\frac{1}{5}+\frac{1}{6}+\frac{1}{7}+...+\frac{1}{2020}\right)$$

$$Y=\frac{1}{20}+\frac{1}{25}+\frac{1}{30}+\frac{1}{35}+.....+\frac{1}{10100}=\frac{1}{5}\left(\frac{1}{4}+\frac{1}{5}+\frac{1}{6}+\frac{1}{7}+...+\frac{1}{2020}\right)$$

Ta có $B=X:Y=3\left(\frac{1}{4}+\frac{1}{5}+\frac{1}{6}+\frac{1}{7}+...+\frac{1}{2020}\right):\frac{1}{5}\left(\frac{1}{4}+\frac{1}{5}+\frac{1}{6}+\frac{1}{7}+...+\frac{1}{2020}\right)=15$

Vậy $B=15$

Câu 142. (Đề thi HSG 6 huyện Vĩnh Tường 2019-2020)

Chứng minh rằng: $\left(\frac{1}{51}+\frac{1}{52}+\frac{1}{53}+.....+\frac{1}{100}\right):\left(\frac{1}{1.2}+\frac{1}{3.4}+\frac{1}{5.6}+.....+\frac{1}{99.100}\right)=1$

Lời giải

$$\left(\frac{1}{1.2}+\frac{1}{3.4}+\frac{1}{5.6}+.....+\frac{1}{99.100}\right)=\frac{1}{1}-\frac{1}{2}+\frac{1}{3}-\frac{1}{4}+\frac{1}{5}-\frac{1}{6}+.....+\frac{1}{99}-\frac{1}{100}$$

$$=1+\frac{1}{2}+\frac{1}{3}+....+\frac{1}{100}-2\left(\frac{1}{2}+\frac{1}{4}+\frac{1}{6}+.....+\frac{1}{100}\right)$$

$$=1+\frac{1}{2}+\frac{1}{3}+....+\frac{1}{100}-\left(\frac{1}{1}+\frac{1}{2}+\frac{1}{3}+.....+\frac{1}{50}\right)=\frac{1}{51}+\frac{1}{52}+\frac{1}{53}+.....+\frac{1}{100}$$

$$\Rightarrow\left(\frac{1}{51}+\frac{1}{52}+\frac{1}{53}+.....+\frac{1}{100}\right):\left(\frac{1}{1.2}+\frac{1}{3.4}+\frac{1}{5.6}+.....+\frac{1}{99.100}\right)=1$$

Câu 143. (Đề thi HSG 6 huyện Vĩnh Lộc 2017-2018)

Thực hiện phép tính:

a) $A=1.2.3....9-1.2.3....8-1.2.3.....8.8$

b) $B=\frac{\left(3.4.2^{16}\right)^2}{11.2^{13}.4^{11}-16^9}$

c) $C=70.\left(\frac{131313}{565656}+\frac{131313}{727272}+\frac{131313}{909090}\right)$

d) $D=\frac{1}{4.9}+\frac{1}{9.14}+\frac{1}{14.19}+.....+\frac{1}{64.69}$

Lời giải

Thực hiện phép tính:

a) $A=1.2.3...9-1.2.3..8-1.2.3...8.8=1.2.3...8.(9-1-8)=0$

b) $B=\frac{\left(3.4.2^{16}\right)^2}{11.2^{13}.4^{11}-16^9}=\frac{\left(3.2^2.2^{16}\right)^2}{11.2^{13}.2^{22}-2^{36}}=\frac{9.2^{36}}{11.2^{35}-2^{36}}=\frac{9.2^{36}}{2^{35}.(11-2)}=\frac{9.2^{36}}{2^{35}.9}=2$

c) $C=70.\left(\frac{131313}{565656}+\frac{131313}{727272}+\frac{131313}{909090}\right)=70.\left(\frac{13}{56}+\frac{13}{72}+\frac{13}{90}\right)$

$= 70.13.\left(\frac{1}{7.8}+\frac{1}{8.9}+\frac{1}{9.10}\right) = 70.13.\left(\frac{1}{7}-\frac{1}{10}\right) = 39$

d) $D = \frac{1}{4.9}+\frac{1}{9.14}+\frac{1}{14.19}+.....+\frac{1}{64.69} = \frac{1}{5}.\left(\frac{1}{4}-\frac{1}{9}+\frac{1}{9}-\frac{1}{14}+\frac{1}{14}-\frac{1}{19}.....+\frac{1}{64}-\frac{1}{69}\right)$

$= \frac{1}{5}.\left(\frac{1}{4}-\frac{1}{69}\right) = \frac{13}{276}$

Câu 144. (Đề thi HSG 6 huyện 2018-2019)

Tính giá trị của các biểu thức sau:

a) $2.\left[\left(6^2-24\right):4\right]+2014$ b) $\left(1+2\frac{1}{3}-3\frac{1}{4}\right):\left(1+3\frac{7}{12}-4\frac{1}{2}\right)$

Lời giải

a) $2.\left[\left(6^2-24\right):4\right]+2014 = 2.\left[(36-24):4\right]+2014 = 2020$

b) $\left(1+2\frac{1}{2}-3\frac{1}{4}\right):\left(1+3\frac{7}{12}-4\frac{1}{2}\right) = \left(\frac{1}{3}-\frac{1}{4}\right):\left(\frac{7}{12}-\frac{1}{2}\right) = \frac{1}{12}:\frac{1}{12} = 1$

Câu 145. (Đề thi HSG 6 huyện 2018-2019)

Thực hiện phép tính bằng cách hợp lý

a) $(-2013).2014+1007.26$ b) $\left(\frac{1313}{1414}+\frac{10}{160}\right)-\left(\frac{130}{140}-\frac{1515}{1616}\right)$

Lời giải

a) $(-2013).2014+1007.26 = (-2013).2014+2014.13$

$= 2014.(-2013+13) = 2014.(-2000) = -4028000$

b) $\left(\frac{1313}{1414}+\frac{10}{160}\right)-\left(\frac{130}{140}-\frac{1515}{1616}\right) = \frac{13}{14}+\frac{1}{16}-\frac{13}{14}+\frac{15}{16} = 1$

Câu 146. (Đề thi HSG 6 huyện Cẩm Thủy 2016-2017)

Tính giá trị các biểu thức sau bằng cách hợp lý:

a) A = 2016 . 2017 + 4034 . (-8)

b) B = $\left(\frac{1515}{1717}+\frac{10}{160}\right)+\left(\frac{-150}{170}+\frac{1515}{1616}\right)$

c) C = $5^{100} - 15 . 5^{98} - 50 . 5^{97}$

Lời giải

a) A= 2016 . 2017 – 2017 . 16= 2017 . (2016 – 16)= 2017 . 2000=4034000

b) B=$\left(\frac{1515}{1717}+\frac{10}{160}\right)+\left(\frac{-150}{170}+\frac{1515}{1616}\right) = \left(\frac{15}{17}+\frac{1}{16}\right)+\left(\frac{-15}{17}+\frac{15}{16}\right) = 1$

c) C= $5^{100} - 15 . 5^{98} - 50 . 5^{97} = 5^{97}$(125 – 75 – 50)= 5^{97} . 0 = 0

Câu 147. (Đề thi HSG 6 huyện Hậu Lộc 2017-2018)

Thực hiện phép tính: $B = \frac{8^5(-5)^8+(-2)^5(-10)^9}{4^{10}.5^7+20^8.4}.\frac{144}{25}$

Lời giải

$B = \frac{8^5(-5)^8+(-2)^5(-10)^9}{4^{10}.5^7+20^8.4}.\frac{144}{25} = \frac{\left(2^3\right)^5 5^8+2^5.10^9}{\left(2^2\right)^{10}.5^7+\left(2^2.5\right)^8.2^2}.\frac{2^4.3^2}{5^2}$

$$=\frac{2^{15}.5^8+2^{14}.5^9}{2^{20}.5^7+2^{18}.5^8}\cdot\frac{2^4.3^2}{5^2}=\frac{2^{14}.5^8(2+5)}{2^{18}.5^7(4+5)}\cdot\frac{2^4.3^2}{5^2}=\frac{5.7}{2^4.9}\cdot\frac{2^4.3^2}{5^2}=\frac{7}{5}$$

Câu 148. (Đề thi HSG 6 huyện)

Thực hiện phép tính: $\dfrac{9.5^{20}.27^9-3.9^{15}.25^9}{7.3^{29}.125^6-3.3^9.15^{19}}$

Lời giải

$$\frac{9.5^{20}.27^9-3.9^{15}.25^9}{7.3^{29}.125^6-3.3^9.15^{19}}=\frac{3^2.5^{20}.3^{27}-3.3^{30}.5^{18}}{7.3^{29}.5^{18}-3^{10}.3^{19}.5^{19}}=$$

$$=\frac{3^{29}.5^{20}-3^{31}.5^{18}}{7.3^{29}.5^{18}-3^{29}.5^{19}}=\frac{3^{29}.5^{18}(5^2-3^2)}{3^{29}.5^{18}(7-5)}=8$$

Câu 149. (Đề thi HSG 6 huyện)

a) Tính nhanh: $\dfrac{1978.1979+1980.21+1958}{1980.1979-1978.1979}$

b) Rút gọn: $\dfrac{5^2.6^{11}.16^2+6^2.12^6.15^2}{2.6^{12}.10^4-81^2.960^3}$

Lời giải

a) $$\frac{1978.1979+1980.21+1958}{1980.1979-1978.1979}=\frac{1978.1979+1979.21+21+1958}{1979.(1980-1978)}$$

$$=\frac{1979.(1978+21)+21+1958}{1979.2}=\frac{1979.(1978+21+1)}{1979.2}=\frac{1979.2000}{1979.2}=1000$$

b) $$\frac{5^2.6^{11}.16^2+6^2.12^6.15^2}{2.6^{12}.10^4-81^2.960^3}=\frac{5^2.(2.3)^{11}.(2^4)^2+(2.3)^2.(2^2.3)^6.(3.5)^2}{2.(2.3)^{12}.(2.5)^4-(3^4)^2.(2^6.3.5)^3}$$

$$=\frac{5^2.2^{19}.3^{11}+2^{14}.3^{10}.5^3}{2^{17}.5^4.3^{12}-3^{11}.2^{18}.5^3}=\frac{5^2.3^{10}.2^{14}.(2^5.3+5)}{2^{17}.5^3.3^{11}.(5.3-2)}=\frac{2^5.3+5}{2^3.5.3.12}$$

$$=\frac{32.3+5}{8.15.12}=\frac{96+5}{120.12}=\frac{101}{1440}$$

Câu 150. (Đề thi HSG 6 huyện)

Cho biểu thức $A=\dfrac{a^3+2a^2-1}{a^3+2a^2+2a+1}$

a) Rút gọn biểu thức

b) Chứng minh rằng nếu a là số nguyên thì giá trị của biểu thức tìm được của câu a, là một phân số tối giản.

Lời giải

a) Ta có: $A=\dfrac{a^3+2a^2-1}{a^3+2a^2+2a+1}=\dfrac{(a+1)(a^2+a-1)}{(a+1)(a^2+a+1)}=\dfrac{a^2+a-1}{a^2+a+1}$

Điều kiện đúng a ≠ -1 (0,25 điểm).

Rút gọn đúng cho 0,75 điểm.

b) Gọi d là ước chung lớn nhất của $a^2 + a – 1$ và $a^2+a +1$ (0,25 điểm).

Vì $a^2 + a – 1 = a(a+1) – 1$ là số lẻ nên d là số lẻ

Mặt khác, $2 = [a^2+a +1 – (a^2 + a – 1)] \vdots d$

Nên d = 1 tức là $a^2 + a + 1$ và $a^2 + a – 1$ nguyên tố cùng nhau. (0, 5 điểm)

Vậy biểu thức A là phân số tối giản. (0,25 điểm)

Câu 151. (Đề thi HSG 6 huyện)

Tính: $A = 4 + 2^2 + 2^3 + 2^4 +. . . + 2^{20}$

Lời giải

$2A = 8 + 2^3 + 2^4 + . . . + 2^{21}.$

$=> 2A – A = 2^{21} +8 – (4 + 2^2) + (2^3 – 2^3) +. . . + (2^{20} – 2^{20}). = 2^{21}.$

Câu 152. (Đề thi HSG 6 huyện)

Cho : $S = 3^0 + 3^2 + 3^4 + 3^6 + ... + 3^{2002}$

a) Tính S

b) Chứng minh $S \vdots 7$

Lời giải

a) Ta có $3^2S = 3^2 + 3^4 + ... + 3^{2002} + 3^{2004}$ (0,5đ)

Suy ra: $8S = 3^{2004} - 1 => S = \dfrac{3^{2004}-1}{8}$ (0,5đ)

b) $S = (3^0 + 3^2 + 3^4) + 3^6(3^0 + 3^2 + 3^4) + ... + 3^{1998}(3^0 + 3^2 + 3^4) =$

$= (3^0 + 3^2 + 3^4)(1 + 3^6 + ... + 3^{1998})$

$= 91(1 + 3^6 + ... + 3^{1998})$ (0,75đ) suy ra: $S \vdots 7$ (0,25đ)

Câu 153. (Đề thi HSG THCS Hưng Mỹ)

Thực hiện phép tính:

$a) 8+12+16+20+....+100$

$b) \left(6^{2007}-6^{2006}\right):6^{2006}$

Lời giải

$a)$ Số số hạng: $(100-8):4+1=24$ (số)

Tổng $=(100+8).24:2=1296$

$b) = 6^{2006}.(6-1):6^{2006}=5$

Câu 154. (Đề thi HSG huyện Hoằng Hóa 2017-2018)

Thực hiện phép tính $A=81.\left[\dfrac{12-\dfrac{12}{7}-\dfrac{12}{289}-\dfrac{12}{85}}{4-\dfrac{4}{7}-\dfrac{4}{289}-\dfrac{4}{85}}:\dfrac{5+\dfrac{5}{13}+\dfrac{5}{169}+\dfrac{5}{91}}{6+\dfrac{6}{13}+\dfrac{6}{169}+\dfrac{6}{91}}\right].\dfrac{158158158}{711711711}$

Lời giải

$A=81.\left[\dfrac{12.\left(1-\dfrac{1}{7}-\dfrac{1}{289}-\dfrac{1}{85}\right)}{4.\left(1-\dfrac{1}{7}-\dfrac{1}{289}-\dfrac{1}{85}\right)}:\dfrac{5.\left(1+\dfrac{1}{13}+\dfrac{1}{169}+\dfrac{1}{91}\right)}{6.\left(1+\dfrac{1}{13}+\dfrac{1}{169}+\dfrac{1}{91}\right)}\right].\dfrac{158.1001001}{711.1001001}$

$=81.\left(\dfrac{12}{4}:\dfrac{5}{6}\right).\dfrac{158}{711}=81.\dfrac{18}{5}.\dfrac{2}{9}=\dfrac{324}{5}$

Câu 155. (Đề thi HSG huyện Hoằng Hóa 2017-2018)

Thực hiện phép tính:

$a)A=\dfrac{5.\left(2^2.3^2\right)^9.\left(2^2\right)^6-2.\left(2^2.3\right)^{14}.3^4}{5.2^{28}.3^{18}-7.2^{29}.3^{18}}$

$b)S=3^0+3^1+3^2+.....+3^{2015}$

Lời giải

$a)A=\dfrac{5.\left(2^2.3^2\right)^9.\left(2^2\right)^6-2.\left(2^2.3\right)^{14}.3^4}{5.2^{28}.3^{18}-7.2^{29}.3^{18}}=\dfrac{5.2.3^{18}.2^{12}-2.2^{28}.3^{14}.3^4}{5.2^{28}.3^{18}-7.2^{29}.3^{18}}$

$=\dfrac{5.2^{30}.3^{18}-2^{29}.3^{18}}{2^{28}.3^{18}.(5-7.2)}=\dfrac{2^{29}.3^{18}.\left(5.2-1\right)}{2^{28}.3^{18}.\left(5-14\right)}=\dfrac{2.9}{-9}=-2$

$b)S=3^0+3^1+3^2+.....+3^{2015}$

$3S=3^1+3^2+.....+3^{2015}+3^{2016}$

$\Rightarrow 2S=3^{2016}-1\Rightarrow S=\dfrac{3^{2016}-1}{2}$

Câu 156. (Đề thi HSG huyện)

a) Tính nhanh: $\dfrac{1978.1979+1980.21+1958}{1980.1979-1978.1979}$

b) Rút gọn: $\dfrac{5^2.6^{11}.16^2+6^2.12^6.15^2}{2.6^{12}.10^4-81^2.960^3}$

Lời giải

a) $\dfrac{1978.1979+1980.21+1958}{1980.1979-1978.1979}=\dfrac{1978.1979+1979.21+21+1958}{1979.(1980-1978)}$

$=\dfrac{1979.(1978+21)+21+1958}{1979.2}=\dfrac{1979.(1978+21+1)}{1979.2}=\dfrac{1979.2000}{1979.2}=1000$

b) $\dfrac{5^2.6^{11}.16^2+6^2.12^6.15^2}{2.6^{12}.10^4-81^2.960^3}=\dfrac{5^2.(2.3)^{11}.\left(2^4\right)^2+(2.3)^2.\left(2^2.3\right)^6.(3.5)^2}{2.(2.3)^{12}.(2.5)^4-\left(3^4\right)^2.\left(2^6.3.5\right)^3}$

$=\dfrac{5^2.2^{19}.3^{11}+2^{14}.3^{10}.5^3}{2^{17}.5^4.3^{12}-3^{11}.2^{18}.5^3}=\dfrac{5^2.3^{10}.2^{14}.\left(2^5.3+5\right)}{2^{17}.5^3.3^{11}.(5.3-2)}=\dfrac{2^5.3+5}{2^3.5.3.12}$

$=\dfrac{32.3+5}{8.15.12}=\dfrac{96+5}{120.12}=\dfrac{101}{1440}$

Câu 157. (Đề thi HSG huyện)

Tính:

$A=\left(\dfrac{1}{7}+\dfrac{1}{23}-\dfrac{1}{1009}\right):\left(\dfrac{1}{23}+\dfrac{1}{7}-\dfrac{1}{1009}+\dfrac{1}{7}.\dfrac{1}{23}.\dfrac{1}{1009}\right)+1:(30.1009-160)$

Lời giải

Ta viết lại A như sau :

$A=\dfrac{(\frac{1}{23}+\frac{1}{7}-\frac{1}{1009}).23.7.1009}{(\frac{1}{23}+\frac{1}{7}-\frac{1}{1009}+\frac{1}{23}.\frac{1}{7}.\frac{1}{1009}).23.7.1009}+\dfrac{1}{(23+7).1009-161+1}$

$=\dfrac{7.1009+23.1009-23.7}{7.1009+23.1009-23.7+1}+\dfrac{1}{23.1009+7.1009-23.7+1}=1$

Câu 158. (Đề thi HSG 6 huyện Trực Ninh 2008-2009)

Cho: $A=\dfrac{1}{2}+\dfrac{1}{3}+\dfrac{1}{4}+\dfrac{1}{5}+....+\dfrac{1}{308}+\dfrac{1}{309}$

$B=\dfrac{308}{1}+\dfrac{307}{2}+\dfrac{306}{3}+...+\dfrac{3}{306}+\dfrac{2}{307}+\dfrac{1}{308}$.

Tính $\dfrac{A}{B}$?

Lời giải

$B=\dfrac{308}{1}+\dfrac{307}{2}+\dfrac{306}{3}+...+\dfrac{3}{306}+\dfrac{2}{307}+\dfrac{1}{308}$

$B=\left(1+\dfrac{307}{2}\right)+\left(1+\dfrac{306}{3}\right)+\left(1+\dfrac{305}{4}\right)+...+\left(1+\dfrac{3}{306}\right)+\left(1+\dfrac{2}{307}\right)+\left(1+\dfrac{1}{308}\right)+1$

$B=\dfrac{309}{2}+\dfrac{309}{3}+\dfrac{309}{4}+...+\dfrac{309}{307}+\dfrac{309}{308}+\dfrac{309}{309}$

$B=309.\left(\frac{1}{2}+\frac{1}{3}+\frac{1}{4}+\frac{1}{5}+...+\frac{1}{307}+\frac{1}{308}+\frac{1}{309}\right)$

$B=309.A$

Vậy $\frac{A}{B}=\frac{A}{309.A}=\frac{1}{309}$.

Câu 159. (Đề thi HSG 6 huyện Đầm Hà trường Quảng Lợi 2007-2008)

Tính tổng:

$A=\frac{1}{24}+\frac{1}{12}+\frac{1}{8}+\frac{1}{2}$

$B=\frac{1}{30}+\frac{1}{10}+\frac{1}{5}+\frac{1}{2}$

Lời giải

$A=\frac{1}{24}+\frac{1}{12}+\frac{1}{8}+\frac{1}{2}$

$=\frac{1}{24}+\frac{2}{24}+\frac{3}{24}+\frac{12}{24}=\frac{18}{24}=\frac{3}{4}$

$B=\frac{1}{30}+\frac{1}{10}+\frac{1}{5}+\frac{1}{2}$

$=\frac{1}{30}+\frac{3}{30}+\frac{6}{30}+\frac{15}{30}=\frac{25}{30}=\frac{5}{6}$

Câu 160. (Đề thi HSG 6)

Tính giá trị các biểu thức sau :

$A=1+2-3-4+5+6-7-8+\ldots-2007-2008+2009+2010$

$B=\frac{7.6^{10}.2^{20}.3^6-2^{19}.6^{15}}{9.6^{19}.2^9-4.3^{17}.2^{26}}$

Lời giải

$A=1+2-3-4+5+6-7-8+\ldots-2007-2008+2009+2010$

$A=1+\left(2-3-4+5\right)+\left(6-7-8+9\right)+\ldots+\left(2006-2007-2008+2009\right)+2010$

$A=1+0+0+\ldots+0+2010=2011$

$B=\frac{7.6^{10}.2^{20}.3^6-2^{19}.6^{15}}{9.6^{19}.2^9-4.3^{17}.2^{26}}=\frac{7.2^{10}.3^{10}.2^{20}.3^6-2^{19}.2^{15}.3^{15}}{3^2.2^{19}.3^{19}.2^9-2^2.2^{26}.3^{17}}$

$=\frac{2^{30}.3^{16}.7-2^{34}.3^{15}}{2^{28}.3^{21}-2^{28}.3^{17}}=\frac{2^{30}.3^{15}.\left(7.3-2^4\right)}{2^{28}.3^{17}\left(3^4-1\right)}=\frac{2^2\left(21-16\right)}{3^2\left(81-1\right)}=\frac{4.5}{9.80}=\frac{1}{36}$

Câu 161. (Đề thi HSG 6 2005-2006)

Thực hiện phép tính: $\frac{9.5^{20}.27^9-3.9^{15}.25^9}{7.3^{29}.125^6-3.3^9.15^{19}}$

Lời giải

Ta có: $\frac{9.5^{20}.27^9-3.9^{15}.25^9}{7.3^{29}.125^6-3.3^9.15^{19}}=\frac{3^2.5^{20}.3^{27}-3.3^{30}.5^{18}}{7.3^{29}.5^{18}-3^{10}.3^{19}.5^{19}}$

$=\frac{3^2.5^{20}.3^{27}-3.3^{30}.5^{18}}{7.3^{29}.5^{18}-3^{10}.3^{19}.5^{19}}=\frac{3^{29}.5^{20}-3^{31}.5^{18}}{7.3^{29}.5^{18}-3^{29}.5^{19}}=\frac{3^{29}.5^{18}\left(5^2-3^2\right)}{3^{29}.5^{18}\left(7-5\right)}=8$

Câu 162.

Thực hiện phép tính

a) $\left(\frac{136}{15}-\frac{28}{5}+\frac{62}{10}\right).\frac{21}{24}$

b) $\left[528:(19,3-15,3)\right]+42(128+75-32)-7314$

c) $\frac{5}{6}+6\frac{5}{6}.\left(11\frac{5}{20}-9\frac{1}{4}\right):8\frac{1}{3}$

Lời giải

a) $\left(\frac{272}{30}-\frac{168}{30}+\frac{186}{30}\right).\frac{21}{24}=\frac{29}{3}.\frac{7}{8}=\frac{203}{24}$

b) $\left[528:(19,3-15,3)\right]+42(128+75-32)-7314=(528:4)+42.171-7314$

$=132+7182-7314=0$

c) $\frac{5}{6}+6\frac{5}{6}.\left(11\frac{5}{20}-9\frac{1}{4}\right):8\frac{1}{3}=\frac{5}{6}+\frac{41}{6}.\left(11\frac{1}{4}-9\frac{1}{4}\right):\frac{25}{3}=\frac{5}{6}+\frac{41}{6}.2.\frac{3}{25}=\frac{5}{6}+\frac{41}{25}=\frac{371}{150}$

Câu 163. Thực hiện các phép tính sau một cách hợp lý:

a) $\left(10^2+11^2+12^2\right):\left(13^2+14^2\right)$

b) $1.2.3...9-1.2.3....8-1.2.3....7.8^2$

c) $\frac{\left(3.4.2^{16}\right)^2}{11.2^{13}.4^{11}-16^9}$

d) $1152-(374+1152)+(-65+374)$

e) $13-12+11+10-9+8-7-6+5-4+3+2-1$

Lời giải

a) $\left(10^2+11^2+12^2\right):\left(13^2+14^2\right)=(100+121+144):(169+196)=365:365=1$

b) $1.2.3....9-1.2.3...7.8-1.2.3...7.8^2=1.2.3...7.8.(9-1-8)=1.2.3...7.8...\times 0=0$

c) $\frac{\left(3.4.2^{16}\right)^2}{11.2^{13}.4^{11}-16^9}=\frac{\left(3.2^2.2^{16}\right)^2}{11.2^{13}.\left(2^2\right)^{11}-\left(2^4\right)^9}=\frac{3^2.\left(2^{18}\right)^2}{11.2^{13}.2^{22}-2^{36}}=\frac{3^2.2^{36}}{11.2^{35}-2^{36}}=\frac{3^2.2^{36}}{2^{35}.(11-2)}=\frac{3^2.2}{9}=2$

d) $1152-(374+1152)+(-65+374)=1152-374-1152+-65+374$

$=(1152-1152)+(374-374)-65=-65$

e) $13-12+11+10-9+8-7-6+5-4+3+2-1$

$=13-(12-11-10+9)+(8-7-6+5)-(4-3-2-1)=13$

Câu 164. **(Đề thi HSG 6 Trường THCS Phú Lương 2018-2019)**

Thực hiện phép tính sau một cách hợp lý

a) $A=\dfrac{636363.37-373737.63}{1+2+3+.....+2012}$

b) $B=1\dfrac{6}{41}.\left(\dfrac{12+\dfrac{12}{19}-\dfrac{12}{37}-\dfrac{12}{37}}{3+\dfrac{3}{19}-\dfrac{3}{37}-\dfrac{3}{53}}:\dfrac{4+\dfrac{4}{17}+\dfrac{4}{19}+\dfrac{4}{2006}}{5+\dfrac{5}{17}+\dfrac{5}{19}+\dfrac{5}{2006}}\right).\dfrac{124242423}{237373735}$

Lời giải

a) $A=\dfrac{63.10101.37-37.10101.63}{1+2+3+...+2012}=\dfrac{0}{1+2+3+...+2012}=0$

b) $B=\dfrac{47}{41}.\left(\dfrac{12.\left(1+\dfrac{1}{19}-\dfrac{1}{37}-\dfrac{1}{53}\right)}{3.\left(1+\dfrac{1}{19}-\dfrac{1}{37}-\dfrac{1}{53}\right)}:\dfrac{4\left(1+\dfrac{1}{17}+\dfrac{1}{19}+\dfrac{1}{2006}\right)}{5.\left(1+\dfrac{1}{17}+\dfrac{1}{19}+\dfrac{1}{2006}\right)}\right).\dfrac{123.1010101}{235.1010101}$

$=\dfrac{47}{41}.\left(4:\dfrac{4}{5}\right).\dfrac{123}{235}=3$

Câu 165. (Đề thi HSG 6 Trường THCS Hưng Mỹ 2018-2019)

Thực hiện phép tính:

a) $8+12+16+20+....+100$

b) $\left(6^{2007}-6^{2006}\right):6^{2006}$

Lời giải

a) Số các số hạng: $\left(100-8\right):4+1=24$ (số)

Tổng $=\left(100+8\right).24:2=1296$

b) $\left(6^{2007}-6^{2006}\right):6^{2006}=6^{2006}.\left(6-1\right):6^{2006}=5$

Câu 166. (Đề thi HSG 6 Phòng GD-ĐT Tam Dương 2018-2019)

Thực hiện phép tính:

a) $S=\dfrac{3}{\left(1.2\right)^2}+\dfrac{5}{\left(2.3\right)^2}+.....+\dfrac{61}{\left(30.31\right)^2}$

b) $B=1\dfrac{6}{41}.\left(\dfrac{12+\dfrac{12}{19}-\dfrac{12}{37}-\dfrac{12}{53}}{3+\dfrac{3}{19}-\dfrac{3}{37}-\dfrac{3}{53}}:\dfrac{4+\dfrac{4}{15}+\dfrac{4}{4}+\dfrac{4}{2013}}{5+\dfrac{5}{15}+\dfrac{5}{4}+\dfrac{5}{2013}}\right).\dfrac{12424243}{237373735}$

Lời giải

a) Ta có: $\dfrac{2n+1}{\left[n\left(n+1\right)\right]^2}=\dfrac{1}{n^2}-\dfrac{1}{\left(n+1\right)^2}$; với $n\in\mathbb{N}*$

Do đó:

$$S=\left(1-\frac{1}{2}\right)^2+\left(\frac{1}{2^2}-\frac{1}{3^2}\right)+.....+\left(\frac{1}{30^2}-\frac{1}{31^2}\right)=1-\frac{1}{31^2}=\frac{31^2-1}{31^2}=\frac{960}{961}$$

b) Ta có:

$$B=1\frac{6}{41}.\left(\frac{12+\frac{12}{19}-\frac{12}{37}-\frac{12}{53}}{3+\frac{3}{19}-\frac{3}{37}-\frac{3}{53}}:\frac{4+\frac{4}{15}+\frac{4}{4}+\frac{4}{2013}}{5+\frac{5}{15}+\frac{5}{4}+\frac{5}{2013}}\right).\frac{124242423}{237373735}$$

$$=\frac{47}{41}.\left[\frac{12.\left(1+\frac{1}{19}-\frac{1}{37}-\frac{1}{53}\right)}{3.\left(1+\frac{1}{19}-\frac{1}{37}-\frac{1}{53}\right)}:\frac{4\left(1+\frac{1}{15}+\frac{1}{4}+\frac{1}{2013}\right)}{5.\left(1+\frac{1}{15}+\frac{1}{4}+\frac{1}{2013}\right)}\right].\frac{41.3.1010101}{47.5.1010101}$$

$$=\frac{47}{41}.\left(4.\frac{5}{4}\right).\frac{41.3}{47.5}=3$$

Câu 167. (Đề thi HSG huyện Tĩnh Gia 2018 - 2019)

a) Tính nhanh: $A=\frac{-5}{9}+\frac{8}{15}+\frac{-2}{11}+\frac{4}{-9}+\frac{7}{15}$

b) Rút gọn phân số : $A=\frac{71.52+53}{530.71-180}$ mà không cần thực hiện phép tính ở tử

Lời giải

a) Ta có: $A=\frac{-5}{9}+\frac{8}{15}+\frac{-2}{11}+\frac{4}{-9}+\frac{7}{15}$

$$=\left(\frac{-5}{9}+\frac{-4}{9}\right)+\left(\frac{8}{15}+\frac{7}{15}\right)+\frac{-2}{11}=-1+1+\frac{-2}{11}=\frac{-2}{11}$$

Vậy $A=\frac{-2}{11}$

b) $A=\frac{71.52+53}{10.(53.71-18)}=\frac{71.52+53}{10.(52.71+71-18)}=\frac{71.52+53}{10.(71.52+53)}=\frac{1}{10}$

Câu 168. (Đề thi HSG 6 huyện Quế Sơn 2018 - 2019)

Thực hiện tính A bằng cách hợp lý nhất: $A=\frac{2000.2001-1000}{2000.2000+1000}$

Lời giải

$$A=\frac{2000.2000+2000-1000}{2000.2000+1000}=\frac{2000.2000+1000}{2000.2000+1000}=1$$

Vậy A = 1

Câu 169. (Đề thi HSG 6 trường THCS Lê Ngọc Hân 1997-1998)

Tìm x: $\left[\dfrac{6:\dfrac{3}{5}-1\dfrac{1}{16}.\dfrac{6}{7}}{4\dfrac{1}{5}.\dfrac{10}{11}+5\dfrac{2}{11}}-\dfrac{\left(\dfrac{3}{20}+\dfrac{1}{2}-\dfrac{1}{15}\right).\dfrac{12}{49}}{3\dfrac{1}{3}+\dfrac{2}{9}}\right].x=2\dfrac{23}{96}$ (1)

Lời giải:

Ta có $\dfrac{6:\dfrac{5}{3}-\dfrac{17}{16}.\dfrac{6}{7}}{\dfrac{21}{5}.\dfrac{10}{11}+\dfrac{57}{11}}-\dfrac{\dfrac{35}{60}.\dfrac{12}{49}}{3\dfrac{5}{9}}=\dfrac{10-\dfrac{51}{56}}{\dfrac{42}{11}+\dfrac{57}{11}}-\dfrac{1}{7}.\dfrac{9}{32}=\dfrac{509}{56}.\dfrac{11}{99}-\dfrac{1}{7}.\dfrac{9}{32}=\dfrac{509}{504}-\dfrac{9}{224}=\dfrac{1955}{2016}$

Nên $(1)\Rightarrow\dfrac{1955}{2016}x=\dfrac{215}{96}\Rightarrow x=\dfrac{215}{96}.\dfrac{2016}{1955}=\dfrac{903}{391}=2\dfrac{121}{391}$

Vậy $x=2\dfrac{121}{391}$

Câu 170. (Đề thi HSG 6)

Thực hiện dãy tính

$$\frac{\left(\dfrac{7}{15}+\dfrac{1414}{4545}+\dfrac{34}{153}\right):3\dfrac{3}{23}-\dfrac{3}{11}\left(2\dfrac{2}{3}-1,75\right)}{\left(\dfrac{3}{7}-0,25\right)^2\left(\dfrac{3}{28}-\dfrac{1}{24}\right)}$$

Lời giải:

$$=\frac{\left(\dfrac{7}{15}+\dfrac{14}{45}+\dfrac{2}{9}\right):\dfrac{72}{23}-\dfrac{3}{11}\left(\dfrac{8}{3}-\dfrac{7}{4}\right)}{\left(\dfrac{3}{7}-\dfrac{1}{4}\right)^2:\left(\dfrac{3}{28}-\dfrac{1}{24}\right)}=\frac{\dfrac{23}{72}-\dfrac{1}{4}}{\dfrac{25}{28}.\dfrac{.6}{11}}=\frac{5}{72}.\frac{28.11}{25.6}=\frac{77}{540}$$

Câu 171. (Đề thi HSG 6 Trường THCS Lê Ngọc Hân 1997-1998)

Tính

a) $26:\left[\dfrac{3:(0,2-0,1)}{(2,5.(0,8+1,2))}+\dfrac{(34,06-33,81).4}{(6,84.(28,75-25,15))}\right]+\dfrac{2}{3}:\dfrac{41}{21}$

b) $\dfrac{92-\dfrac{1}{9}-\dfrac{2}{10}-\dfrac{3}{11}-\ldots-\dfrac{92}{100}}{\dfrac{1}{45}+\dfrac{1}{50}+\dfrac{1}{55}+\ldots+\dfrac{1}{500}}$

Lời giải:

a) $26:\left(\dfrac{30}{5}+\dfrac{0,25}{1,9}\right)+1=26:\left(6+\dfrac{25}{190}+1\right)=26.\dfrac{38}{233}+1=\dfrac{988+233}{233}=\dfrac{1221}{233}=5\dfrac{56}{233}$

b) $\dfrac{\left(1-\dfrac{1}{9}\right)+\left(1-\dfrac{2}{10}\right)+.....+\left(1-\dfrac{92}{100}\right)}{\dfrac{1}{45}+\dfrac{1}{50}+.....+\dfrac{1}{500}}=\dfrac{\dfrac{8}{9}+\dfrac{8}{10}+\dfrac{8}{100}}{\dfrac{1}{5}\left(\dfrac{1}{9}+\dfrac{1}{10}+.....+\dfrac{1}{100}\right)}=8:\dfrac{1}{5}=40$

$\dfrac{\left(\dfrac{7}{15}+\dfrac{14}{45}+\dfrac{2}{9}\right):\dfrac{72}{23}-\dfrac{3}{11}\left(\dfrac{8}{3}-\dfrac{7}{4}\right)}{\left(\dfrac{3}{7}-\dfrac{1}{4}\right)^2:\left(\dfrac{3}{28}-\dfrac{1}{24}\right)}=\dfrac{\dfrac{23}{72}-\dfrac{1}{4}}{\dfrac{25}{28}.\dfrac{.6}{11}}=\dfrac{5}{72}.\dfrac{28.11}{25.6}=\dfrac{77}{540}$

Câu 172. **(Đề thi HSG 6 huyện Thanh Chương 2013-2014)**

Tính A = $\dfrac{1}{4.9}+\dfrac{1}{9.14}+\dfrac{1}{14.19}+...+\dfrac{1}{64.64}$

Lời giải

$A=\dfrac{1}{4.9}+\dfrac{1}{9.14}+\dfrac{1}{14.19}+...+\dfrac{1}{64.69}$

$=\dfrac{1}{5}(\dfrac{1}{4}-\dfrac{1}{9}+\dfrac{1}{9}-\dfrac{1}{14}+...+\dfrac{1}{64}-\dfrac{1}{69})$

$=\dfrac{1}{5}(\dfrac{1}{4}-\dfrac{1}{69})=\dfrac{13}{4.69}$

Câu 173. **(Đề thi HSG 6 huyện Việt Yên 2013-2014)**

Tính tổng: $S=3+\dfrac{3}{2}+\dfrac{3}{2^2}+...+\dfrac{3}{2^9}$

Lời giải

$S=3+\dfrac{3}{2}+\dfrac{3}{2^2}+...+\dfrac{3}{2^9}=3+\dfrac{1}{2}(3+\dfrac{3}{2}+...+\dfrac{3}{2^8})$

Mà $3+\dfrac{3}{2}+...+\dfrac{3}{2^8}=S-\dfrac{3}{2^9}$

Suy ra $S=3+\dfrac{1}{2}(S-\dfrac{3}{2^9})$ hay $2S=6+S-\dfrac{3}{2^9}$ $2S=6+S-\dfrac{3}{2^9}$

Suy ra $S=6-\dfrac{3}{2^9}=6-\dfrac{3}{512}=\dfrac{3069}{512}$

Câu 174. **(Đề thi HSG 6 huyện Việt yên 2013-2014)**

Tính giá trị biểu thức $P=(1-\dfrac{1}{3})(1-\dfrac{1}{6})(1-\dfrac{1}{10})(1-\dfrac{1}{15})...(1-\dfrac{1}{190})$

Lời giải

Ta có: $P=(1-\dfrac{1}{3})(1-\dfrac{1}{6})(1-\dfrac{1}{10})(1-\dfrac{1}{15})...(1-\dfrac{1}{190})$

$=\dfrac{2}{3}.\dfrac{5}{6}.\dfrac{9}{10}.\dfrac{14}{15}...\dfrac{189}{190}$

Ta tìm quy luật các mẫu là: $\frac{2.3}{2};\frac{3.4}{2};\frac{4.5}{2};\frac{5.6}{2};...;\frac{19.20}{2}$

Thay vào P ta được:

$$P=\frac{2.2}{2.3}.\frac{2.5}{3.4}.\frac{2.9}{4.5}.\frac{2.14}{5.6}...\frac{2.189}{19.20}=\frac{1.4}{2.3}.\frac{2.5}{3.4}.\frac{3.6}{4.5}.\frac{4.7}{5.6}...\frac{18.21}{19.20}$$

$$=\frac{1.2.3.4...18(4.5.6.7...21)}{2.3.4.5...19(3.4.5.6...20)}=\frac{1}{19}.\frac{21}{3}=\frac{7}{19}$$

Câu 175. (Đề thi HSG 6 Trường THCS Đỗ Động)

Tính giá trị của biểu thức A=3x y - x tại x= - 2 và y = 1

Lời giải

Thay x = - 2 và y = 1 vào biểu thức A và tính đúng A = 20.

Câu 176. (Đề thi HSG 6 huyện Thanh Oai 2013 – 2014)

Tính nhanh: $A=\frac{1.5.6+2.10.12+4.20.24+9.45.54}{1.3.5+2.6.10+4.12.20+9.27.45}$

Lời giải

$$A=\frac{1.5.6+2.10.12+4.20.24+9.45.54}{1.3.5+2.6.10+4.12.20+9.27.45}=\frac{2(1.3.5+2.6.10+4.12.20+9.27.45)}{1.3.5+2.6.10+4.12.20+9.27.45}=2$$

Câu 177. (Đề thi HSG 6 huyện Thanh Oai 2013 – 2014)

Tìm kết quả của phép nhân $A=\underbrace{666...6}_{100c/s}.\underbrace{999...9}_{100c/s}$

Lời giải

$$A=\underbrace{666...6}_{100c/s}.\underbrace{999...9}_{100c/s}=\underbrace{666...6}_{100c/s}.(\underbrace{100...0}_{100c/s}-1)$$

$$=\underbrace{666...6}_{100c/s}\underbrace{000...0}_{100c/s}-\underbrace{666...6}_{100c/s}$$

$$=\underbrace{666...6}_{99c/s}5\underbrace{333...3}_{99c/s}4$$

Câu 178. (Đề thi HSG 6)

Cho $a,b,c,d\neq 0$ biết. $\frac{2a}{3b}=\frac{3b}{4c}=\frac{4c}{5d}=\frac{5d}{2a}$ Tính: C= $\frac{2a}{3b}+\frac{3b}{4c}+\frac{4c}{5d}+\frac{5d}{2a}$

Lời giải

Đặt $\frac{2a}{3b}=\frac{3b}{4c}=\frac{4c}{5d}=\frac{5d}{2a}=k$

Ta có $\frac{2a}{3b}.\frac{3b}{4c}.\frac{4c}{5d}.\frac{5d}{2a}=k^4$ => $k^4=1\Rightarrow k=\pm 1$.

$\Rightarrow$ C = $\frac{2a}{3b}+\frac{3b}{4c}+\frac{4c}{5d}+\frac{5d}{2a}=\pm 4$