CORREZIONE ARITMETICA

Titolo nota 05/12/2009

Gruppo 1

Es 2

$2+3 = disp$

$pari + disp = disp$

Tutti pari o tutti dispari

$2+4$ è multiplo di 3 (e di 6)

$2+10$ ok

$10+4=14$ non è multiplo di 3 (e di 6)

$1+5$ ok

$1+11$ ok

$5+11$ NO

$6+12=18$

$6+18=24$

$12+18=30$

Due numeri divisibili per 3 $\Rightarrow$ La somma lo è

$100:6=16$

$6, 12, \ldots 6 \cdot 16 = 96$

$3, 9, 15, \ldots 93, 99$

$\underbrace{\qquad\qquad}_{17}$

Es 4 $\quad 20062006 \ldots\ldots 2006$

$$\underbrace{2006}_{2 \cdot 1003} \cdot \underbrace{100010001 \ldots\ldots 10001}_{\text{dispari}}$$

Mai quadrato perfetto

perché 2 con esponente 1, dispari

multiplo di 4

Es 3 $\quad 2^{(2^1)} + 2^{(2^2)} + \ldots\ldots + 2^{(2^{1999})}$

n	ultima cifra di 2^n
1	2
2	4
3	8
→ 4	6
5	2
6	4
7	8
8	6

$$\begin{array}{r} abc \times \\ 2 = \\ \hline \bullet \end{array}$$

→ ultima cifra di $c \times 2$

n multiplo di 4 → ultima cifra di 2^n è 6

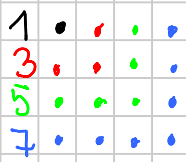
→ l'ultima cifra di $4 + \underbrace{6 + 6 \ldots\ldots + 6}_{1998}$

$$6 \cdot 1998 \rightarrow \text{ultima cifra } 8$$

$$4 + \ldots$$

Ultima cifra $= 2$

Es 6



$$(n+1)^2 - n^2 = 2n+1$$

n dispari $= 2k+1$
$a = 0$
$b = k+1$
$c = k$

n pari $= 2k$
$a = 1$
$b = k$
$c = k-1$

$$a^2 + b^2 - c^2 =$$
$$\cancel{1} + \cancel{k^2} - (k-1)^2 = 2k$$
$$-\cancel{k^2} + 2k - \cancel{1}$$

Es 7

$n = n_1 \ldots n_k$ tutte dispari

$\frac{n}{5}$ k cifre tutte dispari

$n_1 = 5, 7, 9$
$n_2 = 5, 7, 9$

$n_k = 5$

$n_1 n_2 n_3 \ldots 5 \mid 5$

5 $\quad 1 m_2$

$a\, n_2$

$a\, 5$

$m_2 5 \rightarrow a0$

$m_2 5 \rightarrow a5$

$n_1 = 5, 7, 9$
$n_2 = 5, 7, 9$
$n_3 = \ldots$
$\vdots$
$n_{k-1} = 5, 7, 9$
$n_k = 5$

3^{k-1} modi

$$\underbrace{d + (d+2) + (d+4) + \ldots + (d+4002)}_{2002}$$

$$2002d + \underbrace{2+4+\ldots+4002}_{2(1+2+\ldots+2001)}$$

$$2\cdot\frac{2002\ 2001}{2} =$$

$$= 2002d + 2002\cdot 2001 = 2002(\underbrace{2001+d}_{\text{pari}})$$

$$1 + \cancel{3} + \cancel{5} \ldots + 40\cancel{0}3$$

$$\cancel{3} + \cancel{5} + \ldots \cancel{4003} + 4005$$

$4004 = 4005 - 1$

$$a = 1+3+\cancel{\ldots} + (2n-1) = n^2$$

$$b = 1+3+\cancel{\ldots} + (2n-1) + \underset{2(n+1)-1}{(2n+1)} + \ldots + 2(n+2002)-1 =$$

$$= (n+2002)^2$$

$$(n+2002)^2 - n^2 = (n+2002-n)(n+2002+n) =$$

$$= 2002(2002+2n) = 4004(1001+n)$$

Es 9 $\quad (a+b)^4 \quad a-b$

$$\begin{cases} a+b = kp \\ a-b = hp \end{cases}$$

$(a+b)-(a-b) = 2b = (k-h)p$

p divide $2b$

$b = \ell p$

$\to a + \ell p = kp \quad a = (k-\ell)p$

$p = 2$

$a+b, \quad a-b$ pari

a dispari $\quad b$ dispari

$a+b = 4k \quad (a+b)-(a-b) = 2b = 4(k-h)$

$a-b = 4h \quad (a+b)+(a-b) = 2a = 4(k+h)$

$$\underbrace{(a+b)}_{\text{resto 2 diviso per 4}}{}^4 \quad a-b$$

pari ma non multiplo di 4

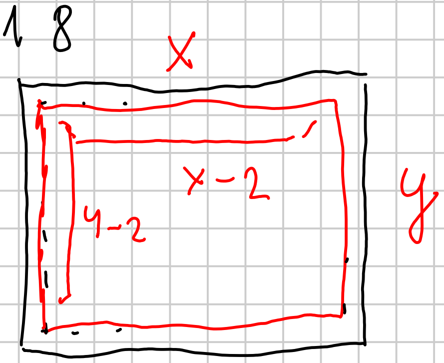
$(a+b)^4$ è divisibile per 16

$a = 17 \quad b = 1$

$(2\cdot 9)^4 \quad 17-1$

$17+1$

Es 18



$$(x-2)(y-2)=2x+2y-4$$

$$xy-2x-2y+4=2x+2y-4$$

$$xy-4x-4y+8=0$$

$$(x-4)(y-4)-8=0$$

$$xy-4x-4y+16-8$$

$$(x-4)(y-4)=8=2^3$$

Esclusi $\begin{cases} -8 & -1 \\ -4 & -2 \end{cases}$

8	1
4	2

$$\boxed{\begin{array}{ll} x=12 & y=5 \\ \hline x=8 & y=6 \end{array}}$$

E SIMMETRICHE

$$\frac{1}{m}+\frac{1}{n}-\frac{1}{mn}=\frac{2}{5} \qquad \times\, 5mn$$

$$5n+5m-5=2mn$$

$n=0$ NO

$$2mn-5m-5n+5=0 \qquad -3 \quad -5 \quad \text{NO}$$

$$4mn-10m-10n+10=0 \qquad (2m-5)(2n-5)=15$$

NO $\left[\begin{array}{l} (am+b)(cn+d)=\text{intero} \\ (2m+b)(n+d) \\ 2mn+2md \end{array}\right.$

$m=3 \leftarrow$ 1	15 $\rightarrow n=10$
$m=4 \leftarrow$ 3	5 $\rightarrow n=5$

(3,10) (10,3)

(4,5) (5,4)

$$2^a - 2^b = 2$$

$$2^a = 2^b + 2 = 2(\underbrace{2^{b-1} + 1})$$

potenza di 2,
ma è dispari, a meno che $b = 1$

$$\frac{2 \cdot 5^m + 10}{3^m + 1} \text{ intero} \qquad \frac{9^m + 1}{5^m + 5} \text{ intero}$$

$$\frac{2(\cancel{5^m + 5})}{3^m + 1} \cdot \frac{9^m + 1}{\cancel{5^m + 5}} \text{ intero} = \frac{2(9^m + 1)}{3^m + 1}$$

$$9^m + 1 = 3^{2m} + 1 = (3^m)^2 + 1$$

$$(3^m)^2 - 1 = (3^m + 1)(3^m - 1)$$

$$\frac{2[(3^m + 1)(3^m - 1) + 2]}{3^m + 1} = 2(3^m - 1) + \frac{4}{3^m + 1}$$

$\cancel{m = 0}$ $\boxed{m = 1}$

$m > 0$

$m = 1$ $\quad \frac{2 \cdot 5 + 10}{3 + 1}$ ok $\quad \frac{9 + 1}{10}$ ok

Es 20

$a^2+3^b=2^c$

a dispari

$a^2\equiv 1 \pmod 3$

$2^c\equiv 1 \Rightarrow c$ pari

$a^2\equiv 1 \pmod 4$

b dispari

$a^2\equiv 1 \pmod 8$

$3^b\equiv 3 \pmod 8$

$a^2+3^b\equiv 4 \pmod 8$

$2^c\equiv 4 \pmod 8$ $c=2$

$a^2+3^b=4$

$1^2+3^1=4$