

⑦

$$5 + 3 + 5 = \underline{13}$$

⑧

$$14 \times 27 = (27 - x) \times 18$$

$$18x = 4 \times 27 \rightarrow \boxed{x = 6}$$

⑨

8 sommets de deg. 3 \rightarrow enl. 4 arêtes.

$$- (4 + 9 + 7 + 2) = - 22$$

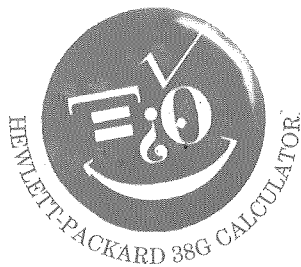
$$- (5 + 11 + 1 + 3) = - 20 \rightarrow 6 \times 13 - 20 = \boxed{58}$$

$$- (1 + 4 + 6 + 12) = - 23$$

$$- (8 + 10 + 9 + 3) = \checkmark$$

$$- (8 + 6 + 2 + 11) = \checkmark$$

$$- (7 + 5 + 10 + 12) = \checkmark$$



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10

$$AEFDZ = 4u$$

$$ADZ = \pi u + u > 4u$$

$$AZ = \pi \frac{3u}{2} > 4u$$

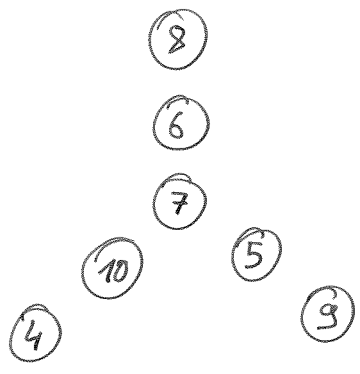
$$AEDZ = u + \frac{2\pi}{3} u + u > 4u$$

11

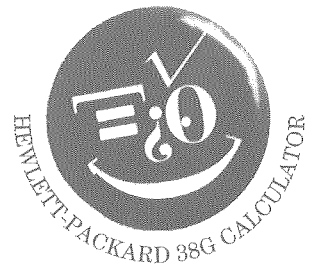
x : centre.

$$42 + x = \dots$$

$$3 \times 21 = 42 + 3x \rightarrow x = 7 \rightarrow 4 \hat{=} 10.$$



+ sym. \rightarrow 2 sol^{ns}

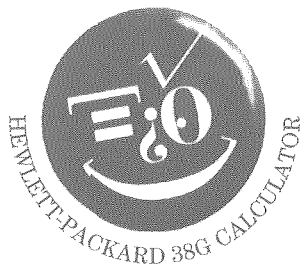
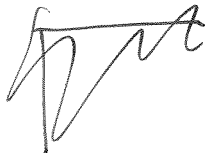


12

X	X		X
	X	X	
		X	X
X			X

X	X	X	
X	X	X	
	X	X	X
X			X

→ 6?



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(14)

$$\begin{aligned}
 2002 &= 2 \times 1001 \\
 &= 2 \times 7 \times 143 \\
 &= 2 \times 7 \times 11 \times 13
 \end{aligned}$$

→ 6 possibilities.

$$A = 2 (abc + bca + cab) (xy + yxy + xzy)$$

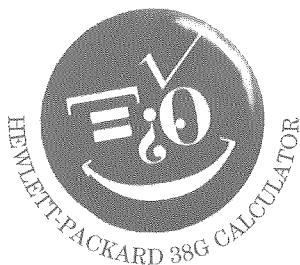
154
462

$$\begin{aligned}
 2 \times (abc + cd + abd) \\
 + abc + bcd + ad \\
 + ab + bcd + acd \\
 + abc + bd + aed \\
 + abd + bcd + ac \\
 + abd + bc + aed)
 \end{aligned}$$

$$\begin{aligned}
 2 \times (14 + 22 + 26 + 77 + 91 + 143) \\
 + 182 + 11 \\
 2 \times (373 \\
 + 462 + 546 + 858 + 3003) \\
 = 2 \times 5242 \\
 = \boxed{10484}
 \end{aligned}$$

$$\begin{aligned}
 = 2 \times (ab + ac + ad + bc + bd + cd \\
 + \frac{1}{3}abc + \frac{1}{3}abd + \frac{1}{3}acd + 3bcd)
 \end{aligned}$$

$$\begin{aligned}
 abc &= 154 \\
 abd &= 182 \\
 acd &= 286 \\
 bcd &= 1001
 \end{aligned}$$



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$$\begin{aligned}
 154, 182, 143 &\rightarrow 479 \\
 154, 1001, 26 &\rightarrow 1181 \\
 14, 1001, 286 &\rightarrow 1301 \\
 154, 91, 286 &\rightarrow 531 \\
 182, 1001, 22 &\rightarrow 1205 \\
 182, 77, 286 &\rightarrow 545
 \end{aligned}$$

x2

$$\begin{aligned}
 2 \times 5242 \\
 \hline
 10484
 \end{aligned}$$

15

B R R B

B R R B

B R R B

B R R B

B R R B

4 → 0

5 → 1

6 → ~~1~~ 1

7 → 2

8 → 2

9 → 2

~~1023~~

$$f(2n) = f(n) + 1 \text{ ou } 2$$

$$f(2n+1) = f(n) + 1 \text{ ou } 2$$

$$f(2002) = f(1001) + 1$$

$$= f(500) + 2$$

$$= f(250) + 3$$

$$= f(125) + 4$$

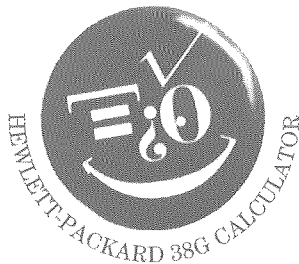
$$= f(62) + 5$$

$$= f(31) + 6$$

$$= f(15) + 7$$

$$= f(7) + 8$$

$$= \boxed{10}$$



96

$$41 \rightarrow 42 \times \frac{41}{42}$$

~~42~~ ① $42 = 21 + 21$

$$42 \times 21$$

reste $40 \times 21 \rightarrow$ ② $10 + 11$

~~42×21~~
~~reste~~ $42 \times 21 + 40 \times 10 + 40 \times 11$

$$21 + 10 + 5 + 4 + 1$$

③ $42 \times 21 + 40 \times 10$
 $+ 2 \times 10 + 2 \times 1 + 38^5 a + 38^6 (11 - a)$

~~④ $42 \times 21 + 42 \times 10 + 2 \times 1$
 $+ 38b + 38(a - b) + 38ac + 38(11 - a - c)$~~

~~$42(a_1 + a_2 + \dots) = a_1 + a_2 + \dots = \frac{41}{42}$~~

$$77 - 42 = 32$$

④ $42 \times 21 + 42 \times 10 + 2 \times 1$
 $+ 38 \times 5 + 38 \times 1 + 36 \times 5 + 2 \times 4 \times 2 \times 1$

⑤ $42 \times 21 + 42 \times 10 + 42 \times 1 + (42 \times 5 + 2)$



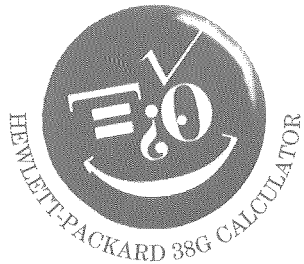
2 solutions.

	01								
AB	01	10							
ABBA	01	10	1001						
ABBA BA AB	↑	1	2	3	4	5	6	7	10010110
	0								8 9 10 11 12 13

* Parite #1

2001: 11111010001
 ↓
 2007: ———0111

(A A B A B B A
 B B A B A A B



(12)

$$1000(D-X) + 100CI + 190C - 12I = M+X$$

Mod 100: ~~-10C - 12I = M+X~~ $\xrightarrow{3} 172$

• $C=1, I=8$ ~~$C=1, I=7$~~

~~$800 + 190 - 84 = 806$~~ $700 + 190 - 84 = 806$

• $C=2, I=6$

$1200 + 380 - 72 = \text{---}$

• $C=3, I=5$

$1500 + 570 - 60 = 2010$

$M+X=10$

$D-X=2$

$X=2, M=8, D=4$

~~$X=6, M=4, D=$~~

• $C=4, I=4$

• $C=5, I=3$

$1500 + 950 - 36 = 3014$

• $C=6, I=3$

$1800 + 1140 -$

• $C=7, I=2$

$1400 + 1320$

• $C=8, I=1$

18 suite.

$$C=5, I=4$$

$$200 + 95 - 5 = 290 \text{ non}$$

$$C=6, I=3$$

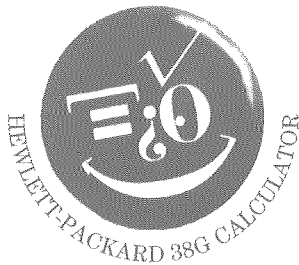
$$180 + 114 - 4 = 290 \text{ non.}$$

$$C=7, I=2$$

$$140 + 133 - 3 = 270 \text{ non.}$$

$$C=8, I=1$$

$$80 + 152 - 2 = 230$$



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