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Name :

FORMAL ARITHMETIC with Integers

Reminders / Reviews / Definitions

1. **NATURAL** Numbers set : $\mathbb{N} = \{0 ; 1 ; 2 ; 3 ; \ldots ; n ; \ldots\}$
2. **INTEGERS** set $\mathbb{Z} = \{\ldots; -n ; \ldots ; -2 ; -1 ; 0 ; 1 ; 2 ;\ldots ; n ; \ldots\}$
3. **DIVISOR** : an **Integer *a*** is a **<u>divisor</u>** of an **Integer *b*** $\underset{\text{by definition}}{\overset{\text{if and only if}}{\Leftrightarrow}}$ there is an **Integer *q*** $(q \neq 0)$ such that $\boldsymbol{b = a.q}$ *Notation* : $\boldsymbol{a \mid b}$
4. **FACTOR** : same as DIVISOR : *a* is a **factor** of *b* $\Leftrightarrow$ $\boldsymbol{b = a.q}$

   $\therefore$ **q** is also a <u>divisor</u> and a <u>factor</u> of b
5. **MULTIPLE** : = ***b*** is a MULTIPLE of ***a*** $\underset{\text{by definition}}{\overset{\text{if and only if}}{\Leftrightarrow}}$ $\boldsymbol{b = a.q}$
6. **GCD** := Greatest Common Divisor of two integers ***a*** and ***b*** :

   Notation : $\boldsymbol{a \wedge b}$ *Ex : 264* $\wedge$ 48 = 24 ; 218 $\wedge$ 318 = 6 ; 27 $\wedge$ 25 = 1
7. **LCM** := Least Common Multiple of two integers ***a*** and ***b***

   Notation : $\boldsymbol{a \vee b}$ *Ex : 264* $\vee$ 48 = 528 ; 218 $\vee$ 318 = 34662
8. **PRIME Number** : = a number which has no other divisor than 1 and itself. Ex : 1 ; ;2 ; 3 ; 5 ; 7 ; 11 ; 13 ; … 2011 (please check !)
9. **PRIME FACTORS** of a natural number : the set of PRIME NUMBERS which divide exactly that number.

   Ex :1092 = 2 x 2 x 3 x 7 x 13 the prime factors are {2 ; 3 ; 7 ; 13}
10. **EUCLIDIAN DIVISION** of ***b*** by ***a*** **:**

    If $\boldsymbol{b = a.q + r}$ with $\boldsymbol{0 \leq r < a}$, then by definition ***r*** is the **REST** of the EUCLIDIAN DIVISION of ***b*** by ***a***, and ***q*** is the **QUOTIENT**.