6M8 Corrigé du devoir I,2 28.11.08

Question 1

(1) $(-2)^{15}\,10^5 \cdot 5^{15} = -10^{15} \cdot 10^5 = -10^{20}$

(2) $\dfrac{9^{41}}{(-3)^{22}} = \dfrac{\left(3^2\right)^{41}}{3^{22}} = \dfrac{3^{82}}{3^{22}} = 3^{60}$

(3) $36^7 \cdot (-5)^0 \cdot (-216)^3 = 6^{14} \cdot 1 \cdot \left(-6^3\right)^3 = -6^{14} \cdot 6^9 = -6^{23}$

Question 2

(1) $12'000'000 \cdot 0,000'06 = 1,2 \cdot 10^7 \cdot \dfrac{6}{10^5} = 7,2 \cdot 10^2$

(2) $\dfrac{4 \cdot 10^{12}}{2500 \cdot 10^5} = \dfrac{16 \cdot 10^{12}}{10'000 \cdot 10^5} = \dfrac{16 \cdot 10^{12}}{10^4 \cdot 10^5} = 16 \cdot 10^3 = 1,6 \cdot 10^4$

(3) $\dfrac{(150'000)^2}{0,001} = \dfrac{\left(1,5 \cdot 10^5\right)^2}{1/1000} = 2,25 \cdot 10^{10} \cdot 1000 = 2,25 \cdot 10^{13}$

Question 3

$$\frac{24^5 \cdot 64^5 \cdot 180^6}{27^5 \cdot 10^6} = \frac{\left(2^3 \cdot 3\right)^5 \cdot \left(2^6\right)^5 \cdot \left(2^2 \cdot 3^2 \cdot 5\right)^6}{\left(3^3\right)^5 \cdot (2 \cdot 5)^6}$$

$$= \frac{2^{15} \cdot 3^5 \cdot 2^{30} \cdot 2^{12} \cdot 3^{12} \cdot 5^6}{3^{15} \cdot 2^6 \cdot 5^6}$$

$$= \frac{2^{57} \cdot 3^{17} \cdot 5^6}{2^6 \cdot 3^{15} \cdot 5^6} = 2^{51} \cdot 3^2 \cdot 5^0$$

Donc : $m = 51$, $n = 2$ et $p = 0$.

Question 4

(1) $(-2x)^3 \cdot \left(x^6 y\right)^3 = -8x^3 \cdot x^{18} \cdot y^3 = -8x^{21}y^3$

(2) $\dfrac{\left(-a^2 b\right)^4}{\left(ab^3\right)^3 \cdot a} = \dfrac{a^8 b^4}{a^3 b^9 a} = \dfrac{a^4}{b^5}$

(3) $\left(\dfrac{z}{k}\right)^3 \cdot \left(-\dfrac{k}{z^2}\right)^5 = -\dfrac{z^3 \cdot k^5}{k^3 \cdot z^{10}} = -\dfrac{k^2}{z^7}$

Question 5

On a : $a = 1,71 \cdot 10^{36}$; $b = 10,71 \cdot 10^{36}$; $c = 10,7 \cdot 10^{36}$.

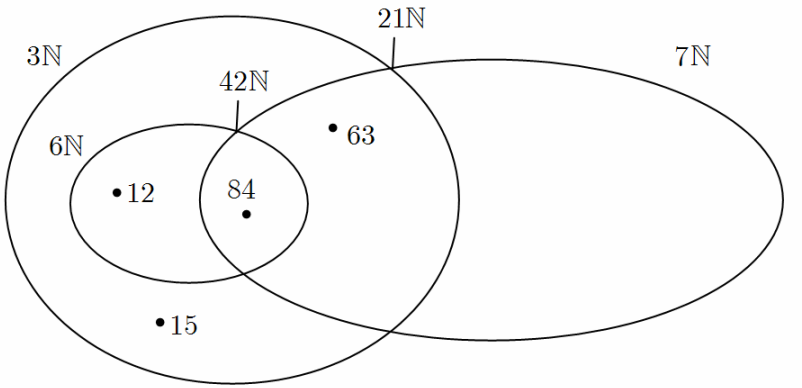
Comme $1,71 < 10,7 < 10,71$, on a : $a < c < b$.

Question 6

(1) $21\mathbb{N} \subset 7\mathbb{N}$, $21\mathbb{N} \subset 3\mathbb{N}$, $6\mathbb{N} \subset 3\mathbb{N}$.

(2) a) $7\mathbb{N} \cap 3\mathbb{N} = 21\mathbb{N}$ b) $6\mathbb{N} \cap 21\mathbb{N} = 42\mathbb{N}$ c) $6\mathbb{N} \cap 7\mathbb{N} = 42\mathbb{N}$

(3) ***Diagramme de Venn*** :



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