***TD sur les fonctions logarithmiques***

# *Exercice N°1 : Intensité acoustique et niveau sonore.*

Buenos Aires a été classée en 2009 comme la 4e ville la plus bruyante au monde. A l’aide d’un sonomètre, on mesure l’intensité acoustique (en W/m²) et le niveau acoustique correspondant (en décibels : dB) dans cette ville aux heures de pointe.***On souhaite étudier le lien entre ces deux grandeurs physiques.***

Les résultats de cette étude sont donnés dans le tableau suivant :

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| ***Intensité acoustique (W/m²)*** | ***Niveau acoustique (dB)*** |
| **0,0000032** | **65** |
| **0,00002** | **73** |
| **0,0001** | **80** |
| **0,0004** | **86** |
| **0,001** | **90** |

1. On peut modéliser le niveau acoustique (noté ***N***) qui se mesure en décibels (dB) par la fonction ***f*** définie sur [0 ; 0,001] par :

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***x*** *représente l’intensité acoustique en W/m² d’un son*

où : ***a*** *est un nombre arrondi au 1/10ecompris entre 0 et 20.*

***b*** *est un nombre entier compris entre -20 et -10.*



5.10-5 10-4 5.10-3 10-3

**90**

**85**

**80**

**75**

**70**

**65**

***I (W/m²***

**10-6**

**10-5**

**10-4**

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| **REAL.** |
| **0** | **1** | **2** |
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| **VAL.** |
| **0** | **1** | **2** |
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| **COMM.** |
| **0** | **1** | **2** |
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Proposer une méthode qui permette de trouver l’expression algébrique de la fonction ***f***.

1. A l’aide de sa courbe représentative, établir le tableau de variation de la fonction ***f***.
2. En utilisant les propriétés des fonctions logarithmiques, exprimer le plus simplement possible l’expression de la fonction ***f*(*x*)**.
3. Représenter graphiquement la fonction ***f*** dans le repère ***SEMI LOGARITHMIQUE*** suivant. Que remarque t-on ?

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| ***N (dB)*** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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| **ANA.** |
| **0** | **1** | **2** |
|  |  |  |

***x***

8

15

155

348

***y***

0,71

1,53

4,57

5,62

***x***

!, # × !%!"

&, ' × !%!"

(, ) × !%!# # × !%!$

***y***

6,3

7,5

10

13,2

***TD sur les fonctions logarithmiques***

1) En utilisant la représentation graphique de la fonction ***f*** dans le cas d’un repère logarithmique, retrouver l’expression de la fonction f obtenue à la question N° 3.

# *Exercice N°2 :*

Dans chaque cas suivant : 1) Placer les points donnés dans le tableau 2)Retrouver l’expression de la fonction qui permet de modéliser la situation.

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5

4

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| **REAL.** |
| **0** | **1** | **2** |
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10 100 1000 10000

25

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10-6 10-5 10-4 10-3