

# BACCALAURÉAT-Session 2015

## Epreuve de Discipline Non Linguistique

### Mathématiques/Anglais

#### The Simpsons and their mathematical secrets

Without doubt, the most mathematically sophisticated television show in the history of primetime broadcasting is The Simpsons.

Al Jean, the executive producer, went to Harvard University to study mathematics at the age of just 16. Others have similarly impressive degrees in mathematics, and Jeff Westbrook resigned from a senior research post at Yale University to write scripts.

"Colonel Homer" features the local movie theatre, called the Springfield Googolplex.

In order to appreciate this reference, it is necessary to go back to 1938, when the mathematician Edward Kasner casually mentioned that it would be useful to have a label to describe the number  $10^{100}$ . His nine-year-old nephew Milton Sirota suggested the word googol.

At the same time, he gave a name for a still larger number: 'googolplex'. It was first suggested that a googolplex should be 1 followed by writing zeros until you get tired."

The uncle rightly felt that the googolplex would then be a somewhat arbitrary and subjective number, so he redefined the googolplex as  $10^{\text{googol}}$  (that is 1 followed by a googol zeros) which is far more zeros than you could fit on a piece of paper the size of the observable universe, even if you used the smallest font imaginable.

*From The Guardian Weekly, 4<sup>th</sup> October, 2013*

#### Questions

1. Make a short presentation of The Simpsons and the show's writing team.
2. a. How can you write differently the number  $10^{100}$ ? The number  $10^{-3}$ ?  
b. Explain the rules of powers, the main uses and advantages of powers of ten.  
c. A trillion is 1,000,000,000,000. The total French public debt amounted to 2 trillion euros which represents 95.1 per cent of gross domestic product (GDP) according to national statistics agency INSEE (on Sept., 30<sup>th</sup>, 2014).

Estimate the deficit this year which is forecast to be about 4 percent of GDP.

3. The term googol was adopted by Larry Page and Sergey Brin as the name of their search engine which provides access to vast amounts of information. They preferred a common misspelling, so the company is called Google. It has become well known today. What do you think of Google?