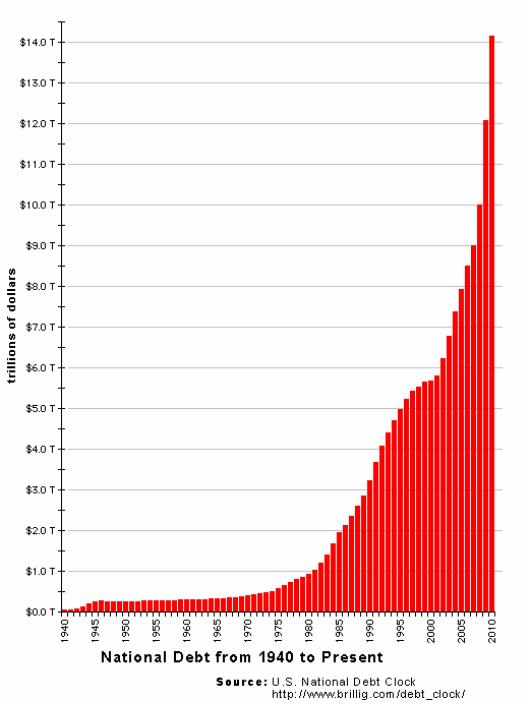
Épreuve de section européenne

National Debt in the USA

The bar graph on the right shows the evolution of the federal debt in the USA during the last 70 years. Recently, Fitch Ratings affirmed the U.S. government's AAA rating but lowered its long-term rating outlook from "stable" to "negative" and warned that there is "a slightly greater than 50 percent chance of a downgrade over a two-year horizon".

The U.S. economy remains one of the most productive in the world, Fitch noted, while the dollar is still "the preeminent global reserve currency". This enables Washington to borrow at low interest rates, at least for now.

But Fitch projects that federal debt held by the public could exceed 90 percent of the Gross Domestic Product (GDP) by the end of the decade – with interest consuming more than 20 percent of the government's tax revenue. That level of debt, Fitch warned, would limit the government's ability to respond to future economic and financial crises.



Adapted from *Concord Coalition*

Questions

1. Considering that the actual debt is 14 trillions (14×10^{12}) of dollars, and knowing that the debt is equal to 90% of the GDP, find the actual GDP.
2. This bar graph is similar to the graph of a classic function. Which one is it?
3. Compute to 2 DP the values of z in the table below, where index $x = 1$ corresponds to year 1940, and debt y is given in trillions of dollars.

Year	1940	1950	1960	1970	1980	1990	2000	2010
Index x	1	2	3	4	5	6	7	8
Debt y	0,1	0,3	0,4	0,5	1	2,8	5,6	14,2
$z = \ln(y)$								

4. Use your calculator to find an equation of a linear trend line of z in x with the method of the least squares.
5. Check that the expression of y as a function of x is $y \approx 0.062 \times 1.9^x$, then compare the model to the table above.
6. According to this model, what would the US national debt be in 2020 ?