

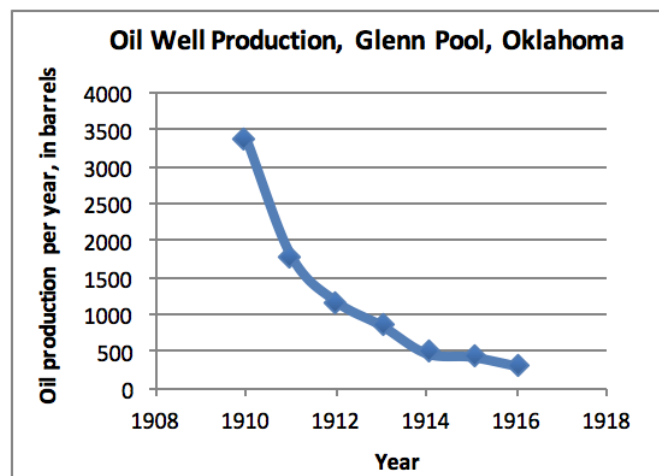
TASK: What is e ?

1. Consider the sequence given by $a_n = \left(1 + \frac{1}{n}\right)^n$, where $n \geq 1$ is an integer.
 - a. Use your calculator to approximate the first 5 terms of this sequence to 7 decimal places.
 - b. Does it appear that this sequence settles near a particular value?
 - c. Use a calculator to approximate the following terms of this sequence to 7 decimal places.
 - i. a_{100}
 - ii. $a_{1,000}$
 - iii. $a_{10,000}$
 - iv. $a_{100,000}$
 - v. $a_{1,000,000}$
 - vi. $a_{10,000,000}$
 - vii. $a_{100,000,000}$
 - d. Does it appear that this sequence settles near a particular value?
 - e. Compare the results of this exercise with the results of the video you watched. What do you observe?

2. If $x = 5a^4$ and $a = 2e^3$, express x in terms of e , and approximate to the nearest whole number.

3. If $a = 2b^3$ and $b = -\frac{1}{2}e^{-2}$, express a in terms of e , and approximate to four decimal places.

4. The following graph shows the number of barrels of oil produced by the Glenn Pool well in Oklahoma from 1910 to 1916. Estimate the average rate of change of the amount of oil produced by the well on the interval $[1910, 1916]$, and explain what that number represents.



Source: Cutler, Willard W., Jr. Estimation of Underground Oil Reserves by Oil-Well Production Curves, U.S. Department of the Interior, 1924.