2. [11 points] The population of Detroit in 1970 was 1.51 million and by 1990 it was 1.03 million.

In parts (a)–(c) below, use the following variable definitions:

- Let D be the population of Detroit in **millions of people**.
- Let t be **years since 1970**.

a. [3 points] If we assume the population of Detroit decreased **exponentially** as a function of time, find a formula for $D = E(t)$.

Show all work. Leave constants in exact form, or rounded to at least two decimal places.

$D = E(t) =$ _____

b. [2 points] Is the graph of $D = E(t)$ concave up or concave down or neither? Provide a small sketch or explain *briefly* how you know.

(Circle One) CONCAVE UP CONCAVE DOWN

Explanation or Sketch:

c. [3 points] If we assume, instead, that the population of Detroit decreased **linearly** as a function of time, find a formula for $D = L(t)$.

Show all work. Leave constants in exact form, or rounded to at least two decimal places.

$D = L(t) =$ _____

d. [3 points] Fort Myers, Florida had a population of 105,260 at the beginning of 2022, which grew by 6.82% over the next year. If the population continues to grow exponentially, how large will the city be in 2030?

Show all work. Leave answer in exact form, or rounded to the nearest whole number.

Population in 2030: _____