Problem: Population Growth in Suzhou and Shanghai

The cities of Suzhou and Shanghai in China have experienced rapid population growth over the past few decades. Let's model this growth using logarithmic functions.

The population of Suzhou in the year 2000 was 5 million, and it grew to 11 million by 2020. Assuming the population growth can be modeled by an exponential function of the form $P(t) = P_o \times e^{kt}$ where $P(t)$ is the population at time , t, years after 2000, $P_o$is the initial population, and k is a constant.

a) Find the value of k.

Similarly, the population of Shanghai in the year 2000 was 16 million, and it grew to 25 million by 2020.

a) Using the same exponential model, find the value of k for Shanghai.

b) By what year will the population of Suzhou be equal to half of the population of Shanghai, assuming the growth rates for both cities remain constant?

Financial Analyst

A financial analyst in Shanghai is studying the growth of a particular company listed on the SSE. The company's growth can be modeled by an exponential function. The analyst observes that the company's revenue doubled over a span of 5 years.

Given the formula for exponential growth: $R(t) = R_0 \times 2^{\frac{t}{P}}$

, where:

$R(t)$

R_0 is

P is t

is the period it takes for the revenue to double
is the initial revenue
is the period it takes for the revenue to double

Using logarithms, determine the value of P given that the revenue doubled in 5 years.
If the company's initial revenue R was $1 million, what will be the projected revenue after 8 years?
How many years will it take for the company's revenue to reach $8 million?