

3. According to the U.S. Bureau of the Census, the world population in 2004 was 6.393 billion people and the world population in 2011 is projected to be 7.12 billion people. Assume that the world population is growing exponentially. Thus,

$$\frac{dP}{dt} = kP$$

Where t is time in years after 2004, P is the world population in billions and k is the exponential growth constant. We assume for simplicity that the population data is for the beginning of the year.

- a) Find the function that satisfies the initial-value problem.
- b) Estimate the world population in 2030.
- c) After what period of time will the world population double?