
1. The US Census Bureau predicts that the African-American population will increase from 35.3 million in 2000 to 59.2 million in 2050.

(a) Find a model for this data in which $t = 0$ corresponds to 2000.

(b) What is the projected African-American population in 2004? in 2030?

(c) Estimate the year in which the African American population will reach 55 million.

2. Newton's Law of Cooling says that the rate at which a body cools is proportional to the difference in temperature between the body and an environment into which it is introduced. The temperature $F(t)$ of the body at time t after being introduced into an environment have constant temperature T_0 is

$$F(t) = T_0 + Cb^t$$

where C and b are constants.

Boiling water, at 100°C , is placed in a freezer at 0°C . The temperature of the water is 50°C after 24 minutes. Find the temperature of the water after 96 minutes.

3. An aluminum beam was brought from the outside cold into a machine shop where the temperature was held at 65°F . After 10 min, the beam warmed to 35°F and after another 10 min it was 50° . Use Newton's Law of Cooling to estimate the beam's initial temperature.