

Example 1

Consider a population of bacteria that grows according to the function $f(t) = 200 \times 1.0202^t$, where t is measured in minutes.

- a) What is the initial population of bacteria?
- b) What is the growth factor for the population?
- c) What is the hourly growth factor for the population?
- d) How many bacteria are present in the population after 5 hours (300 minutes)?
- e) When does the population reach 100,000 bacteria?

Example 2

A culture of bacteria doubles in 3 hours.

- a) What is the hourly growth factor?
- b) How many hours does it take to multiply by 10?

Example 3

One of the most common applications of an exponential decay model is carbon dating. The half-life of carbon-14 is approximately 5730 years - meaning, after that many years, half the material has converted from the carbon-14 to nitrogen-14.

- a) What is the annual decay factor for carbon-14 decay?
- b) If we have 100g of carbon-14 today, how much is left in 50 years?
- c) If an artifact that originally contained 100g of carbon-14 now contains 10g of carbon-14, how old is it? Round the answer to the nearest hundred years.