

Activity 4
June 21, 2002

Name:

Find the number c such that the following function is continuous:

$$f(x) = \begin{cases} \frac{x^3 - 8}{x - 2} & \text{if } x \neq 2 \\ c & \text{if } x = 2 \end{cases}$$

A population of bacteria grows exponentially over a short period of time. A formula for this growth is:

$$P(t) = P_0 b^t$$

where t is time in hours, $P(t)$ is the population after t hours, P_0 is the initial population, and b is a positive constant.

Suppose a particular bacteria grows exponentially. After one hour, the population grows from 500,000 to 800,000. Find the value of b for this bacteria.

What would the formula be for computing the population of this bacteria after t hours?

On the other hand, radon gas decays exponentially, by a similar formula

$$y(t) = y_0(0.835)^t$$

where y_0 is the initial amount, t is now time in days, and $y(t)$ is the amount remaining after t days.

Suppose we start with 100 cubic centimeters of radon gas. How much will remain after 12 days?

Bonus question: What do you think makes the difference (in the formulas) between exponential *growth* and exponential *decay*?