

Math Diversion Problem 707

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The YouTube video is found at:

Source: <https://www.youtube.com/watch?v=DvCeDCjrxU&list=PLD0D070C218D8F5A3&index=18>
Title: GRE Math Practice: Word Problem - Example 5
Presenter: Magoosh Test Prep for GRE

1 The Problem

The population of bacteria doubles every 30 minutes. At 3:30 pm on Monday, the population was 240. Which is larger: Column A or Column B:

<u>Column A</u>	<u>Column B</u>
The bacteria population at 2:00 pm on Monday	40

2 The Solution

This is a standard problem in what's called exponential growth, marked by some initial quantity that's being multiplied by a fixed amount (in this problem by 2) in some set time interval, which in this problem the time interval is every 30 minutes, so we need to **count the number of thirty minute intervals from start to finish**, or finish to start. And between 2:00 pm and 3:30 pm, there are precisely 3 thirty minute intervals. So, the equation for the amount at time t is, where A_0 is the amount of bacteria at 2:00 pm (our unknown):

$$A(t) = A_0 2^{t[30 \text{ min intervals}]} . \quad (1)$$

So, with $t = 3$, then the equation becomes

$$A(3) = A_0 2^3 = 240 . \quad (2)$$

Solving this for A_0 , we get

$$A_0 = \frac{240}{8} = 30 . \quad (3)$$

So, Column B is the answer.