

5.4.125

Exercise 5.4.125 The function $D(h) = 5e^{-0.4h}$ can be used to find the number of milligrams D of a certain drug that is in a patient's bloodstream h hours after the drug was administered. When the number of milligrams reaches 2, the drug is to be administered again. What is the time between injections?

Solution

We need to solve for h when $D(h) = 2$.
So we consider $D(h) = 5e^{-0.4h} = 2$,

or $e^{-0.4h} = 2/5$. This means

$$\log_e(2/5) = -0.4h \quad \text{or} \quad \ln(2/5) = -0.4h$$

$$\text{or } h = \frac{\ln(2/5)}{-0.4} = \frac{\ln(0.4)}{-0.4} \approx 2.3 \text{ hours. } \square$$