Assignment 1 - Solutions

September 11, 2025

1. Find the solution to $x' = 2t + 1$ satisfying the condition $x(0) = 3$
   Solution: We can simply integrate both sides with respect to t and we get:

$$x(t) = t^2 + t + C$$

   and plugging in the initial condition gives $C = 3$, so the answer is $x(t) = t^2 + t + 3$

2. Suppose the population of deer in a small forest satisfies $\frac{dP}{dt} = 0.0225P - 0.0003P^2$, where P is the number of deer and t is the time in months.

   (a) Construct a slope field.
   Solution: Any slope field here is fine. Plugging the equation into wolfram alpha can give you an idea of what your slope field should look like.