Homework I

1. Put a potato into an oven. The temperature of the potato at $t=0$ is $T\_{0}$ and it will heat up. Denote the temperature at $t$ as $T\left(t\right)$. The temperature of the oven is a constant $T\_{e}.$

Newton has a law stating that the heat transfer from oven to potato (proportional to the change of $T\left(t\right)) $per unit time is proportional to the temperature difference $T\_{e}-T\left(t\right)$. Therefore we can write down an equation:

$$\frac{dT}{dt}=-h\left[T\_{e}-T\left(t\right)\right]$$

Solve $T\left(t\right)$.

1. Arfken Exercise 7.2.3
2. The function $x\left(t\right)$ satisfies

$$\frac{dx}{dt}=2tx^{2}, x\left(0\right)=1$$

Solve $x\left(t=2\right)$

1. Solve the equation of $x\left(t\right)$

$$x^{'}+\frac{1}{t}x=1, x\left(1\right)=3$$