Question

A damped mass-spring system is governed by the equations

$$\dot{x} = v \qquad \dot{v} = -4v - 3x$$

What term in this system describes the damping and which one describes the spring?

Find v as a function of x.

Obtain the solution to the equation and calculate the corresponding velocity when

$$x(0) = 4 \quad v(0) = 0.$$

Roughly sketch $x(t)$ and $v(t)$.

Determine whether the system, under-damped, critically damped or over-damped. (*)

Answer