Resistance Proportional to Velocity

If we agree to ignore wind or other external factors, we can say that resistance to forward movement will be proportional to the velocity of the object. Lower speed will result in less resistance to forward movement and a higher speed will mean more resistance. That relationship can be expressed by an equation.

Force = mass * acceleration Force = m * dv/dt
Because force is proportional, we can rewrite this as: m * dv/dt = - kv dv/dt = - (k/m)v
We already know how to rewrite a differential equation of exponential change: $v = v_0 e^{-(k/m)t}$

We will do some of these problems in the HW section. This is another formula that you will not have to memorize – if you need it on the test I will give it to you.