Quiz 1

1. Here is Newton's second law in polar coordinates:

$$\vec{F} = m\left(\ddot{r} - r\dot{\phi}^2\right)\hat{r} + m(r\ddot{\phi} + 2\dot{r}\dot{\phi})\hat{\phi} \tag{1}$$

   Simplify these equations for the case of circular motion (hint: r is constant).

2. Drag force depends most directly on *(select one)*:

   (a) position
   (b) velocity
   (c) acceleration

3. The following differential equation will commonly appear in problems with drag force. Find $v(t)$ by solving this differential equation. Use $v(t = 0) = v_0$.

$$\dot{v} = -kv \tag{2}$$