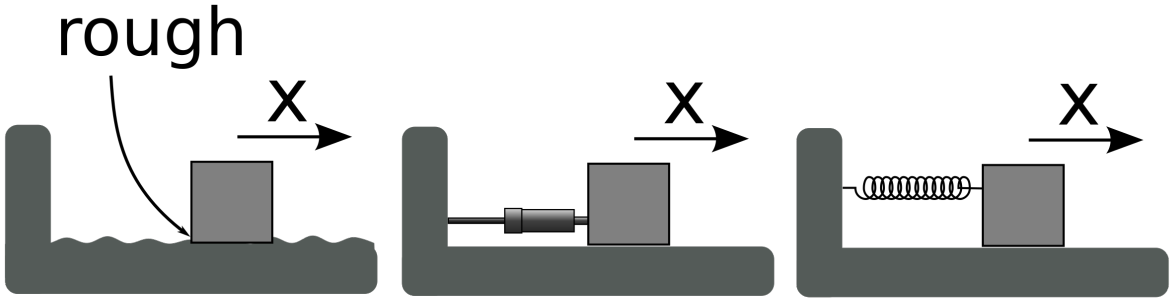
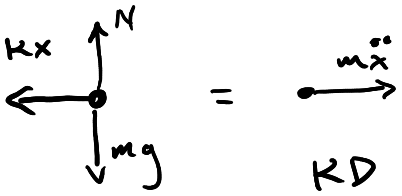


(a) (b) (c)



(a) $\ddot{x} = -\mu g$

(b) $\ddot{x} = -\frac{b}{m}\dot{x}$

(c) $\ddot{x} = -\frac{k}{m}x$

$\Downarrow$

$-\frac{k}{m}x = \ddot{x}$ eom

$\Rightarrow \ddot{x} = -\omega^2 x$

$\omega = \sqrt{k/m} = \sqrt{\frac{4\,N/m}{1\,kg}} = 2\,\frac{rad}{s}$

$x(t) = A\cos\omega t + B\sin\omega t$

$x(0) = 0 = A\cdot 1 + B\cdot 0 \Rightarrow A = 0$

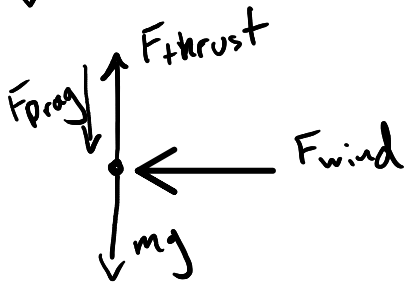
$\dot{x}(0) = 10\,m/s = B\cdot\omega\cos(0)$

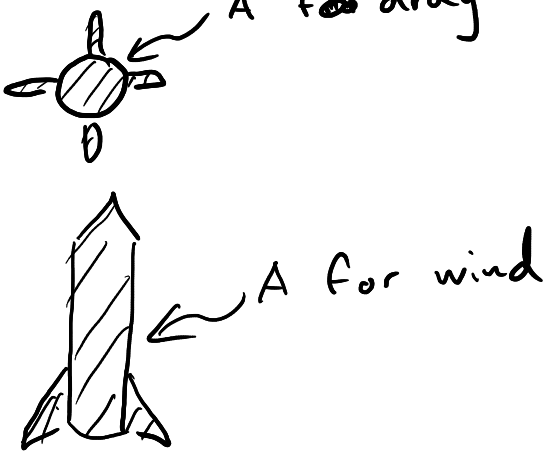
note $\frac{d}{dt}(\sin\omega t) = \omega\cdot\cos\omega t$

$x(t) = \frac{10}{\omega}\cdot\sin\omega t = 5\sin 2t$

thrust
wind
drag
gravity

} FBD





Quiz_01

- what was important?
- how do you demonstrate that?