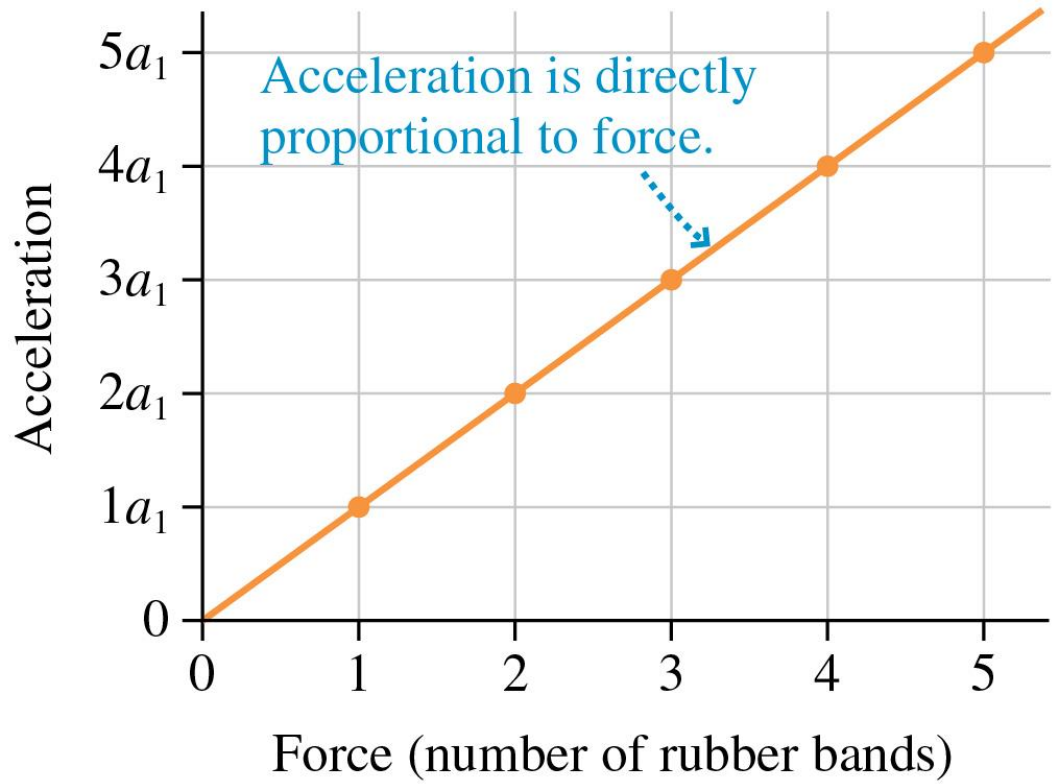
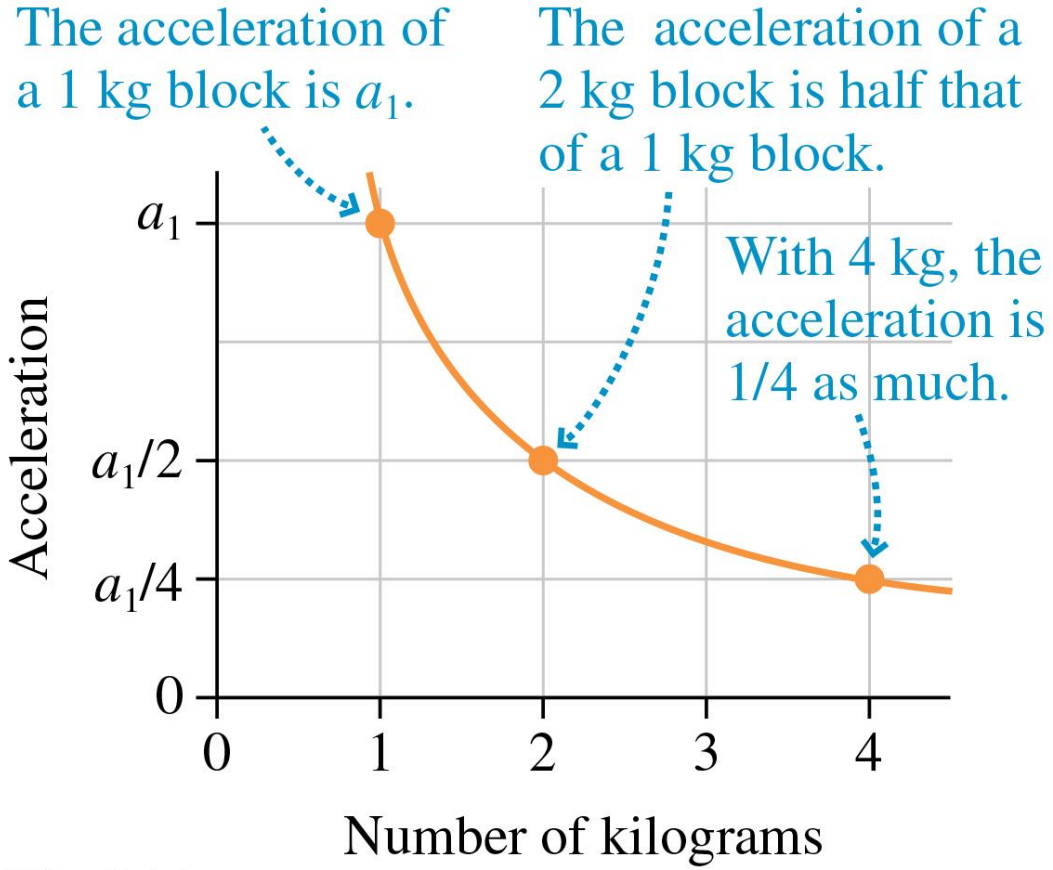
How do they determine this speed limit?

Chapter 5 – Forces

- What are forces (in physics)
- Concept: System
- New representation: Free-Body Diagrams (FBD)
- Newton's Laws





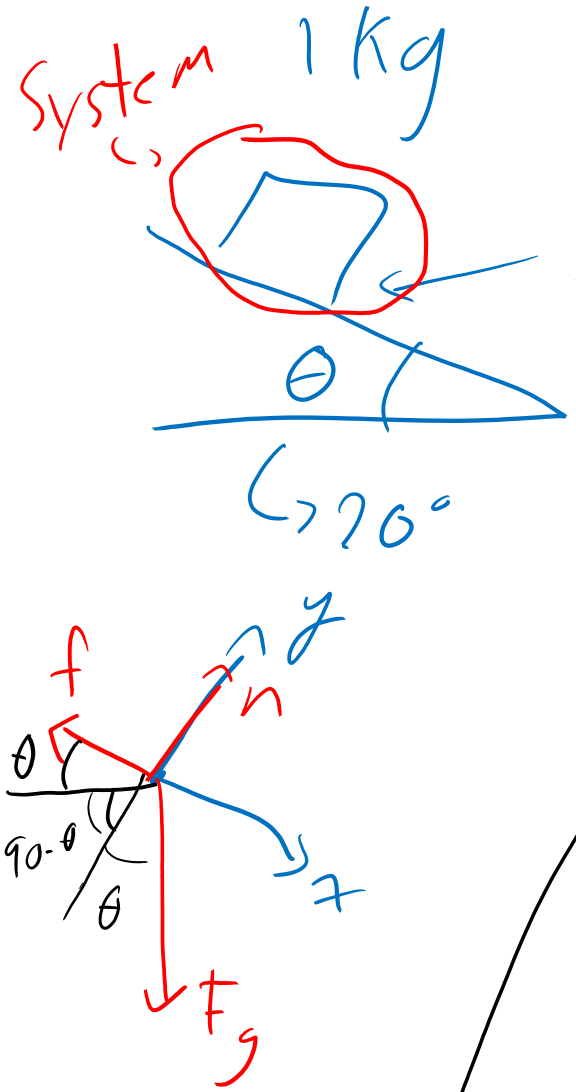
Newton's second law An object of mass m subjected to forces $\vec{F}_1, \vec{F}_2, \vec{F}_3, \ldots$ will undergo an acceleration $\vec{a}$ given by

$$\vec{a} = \frac{\vec{F}_{\text{net}}}{m} \tag{5.4}$$

where the net force $\vec{F}_{\text{net}} = \vec{F}_1 + \vec{F}_2 + \vec{F}_3 + \cdots$ is the vector sum of all forces acting on the object. The acceleration vector $\vec{a}$ points in the same direction as the net force vector $\vec{F}_{\text{net}}$.

You’re in a moving car when it turns left. You get pushed to the right. Explain this as a blog post without equations. Keep it simple. Make it fun, if possible.

Team Up Questions



x: $+mg\sin\theta - f = ma_x$

y: $n - mg\cos\theta = ma_y = 0$

$a_y \rightarrow 0$

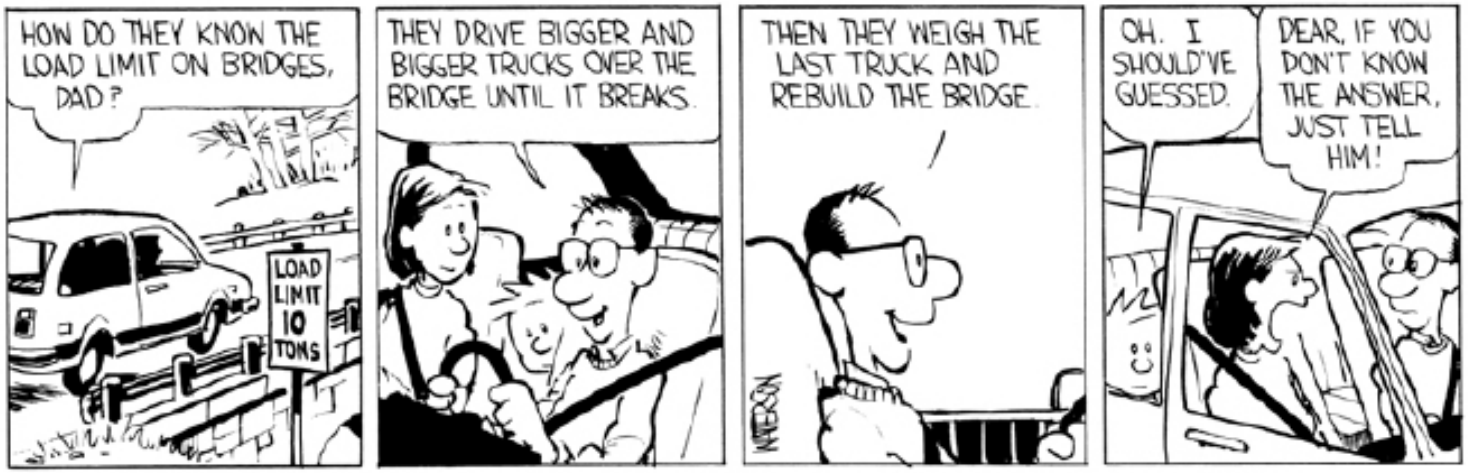
$n = mg\cos\theta$

$\boxed{f = \mu n} = \mu mg\cos\theta$

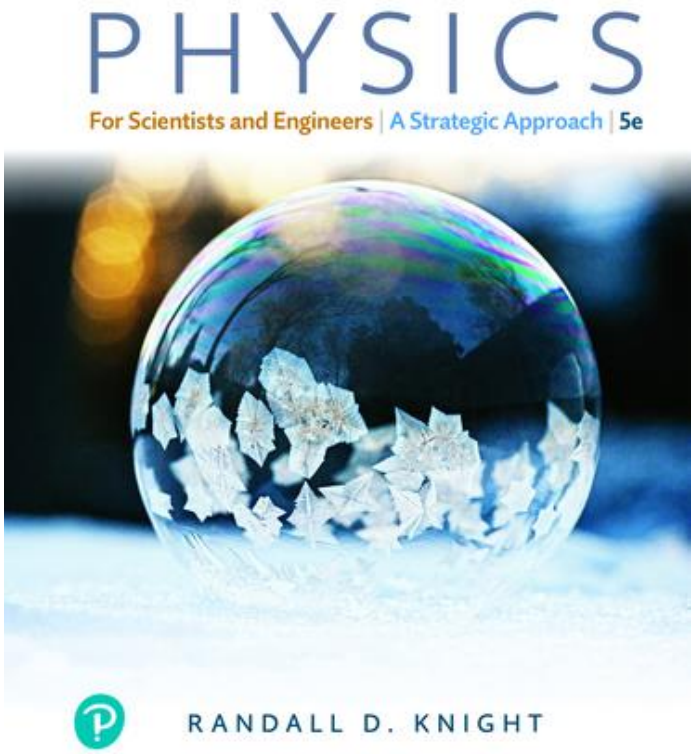
$a_y = \frac{1}{m}(mg\sin\theta - \mu mg\cos\theta)$

n f

How do they determine the proper speed on a ramp?



OR



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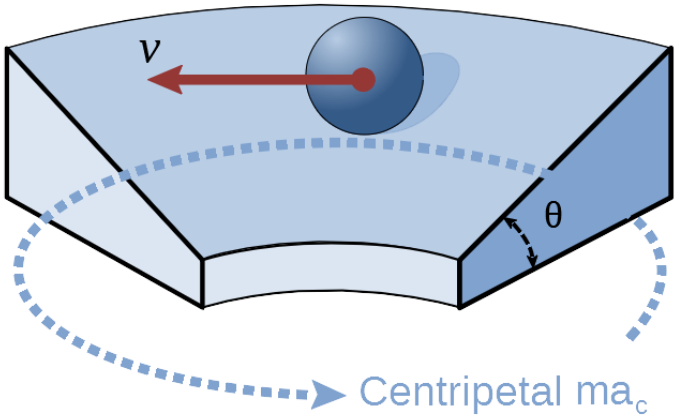

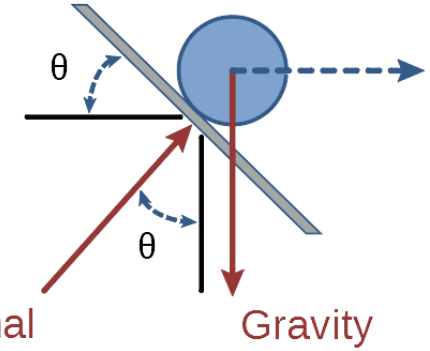

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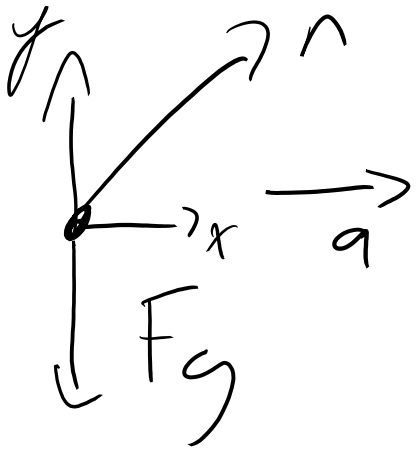
$$y: n\cos\theta - mg = 0$$

$$x: n\sin\theta = ma_x = m\frac{v^2}{R}$$

$$n = \frac{mg}{\cos\theta}$$

$$\frac{mv^2}{R} = n\sin\theta$$



$$\frac{mv^2}{R} = \frac{mg}{\cos\theta}\sin\theta$$

$$\boxed{v^2 = gR\tan\theta}$$