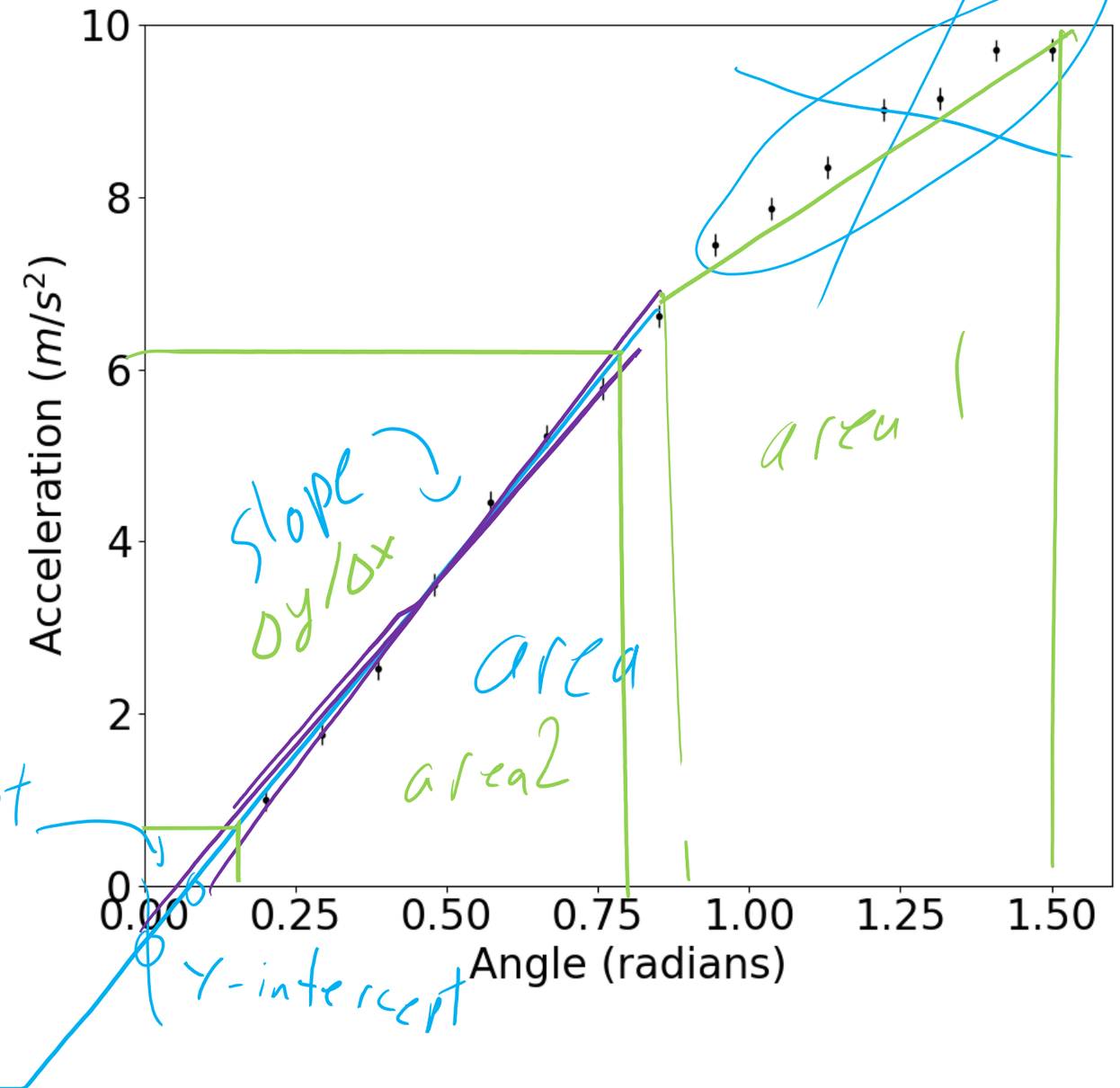
Data Analysis Question:
What's the coefficient of friction?



$a(\theta)$

small θ

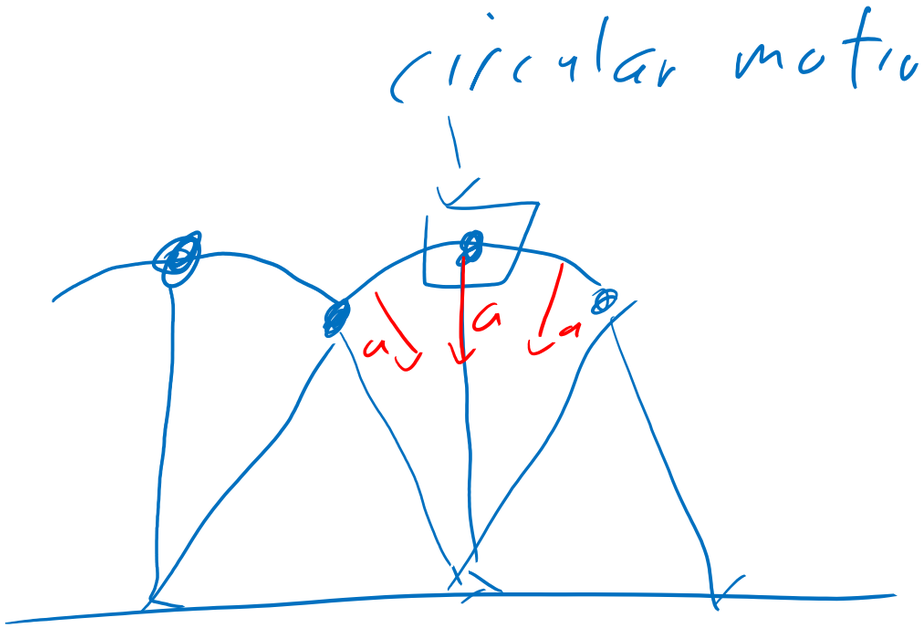
$\sin\theta \approx \theta$

$\cos\theta \approx 1$

Chapter 8 – Dynamics in 2D

- Uniform/Nonuniform Circular Motion
- Centrifugal (fictitious) force

Modeling Question:
What's the maximum speed of walking?



y: $mg - n = mv^2/R$

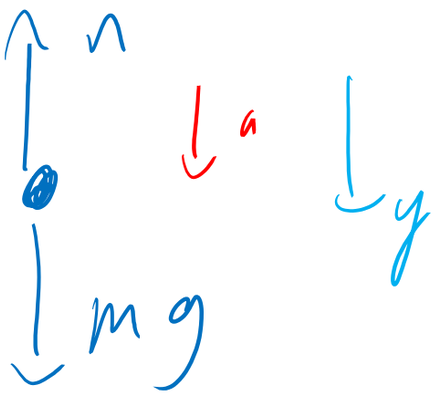
critical case → $n = 0$

$mg = mv^2/R$

$v^2 = gR \rightarrow v = \sqrt{gR}$

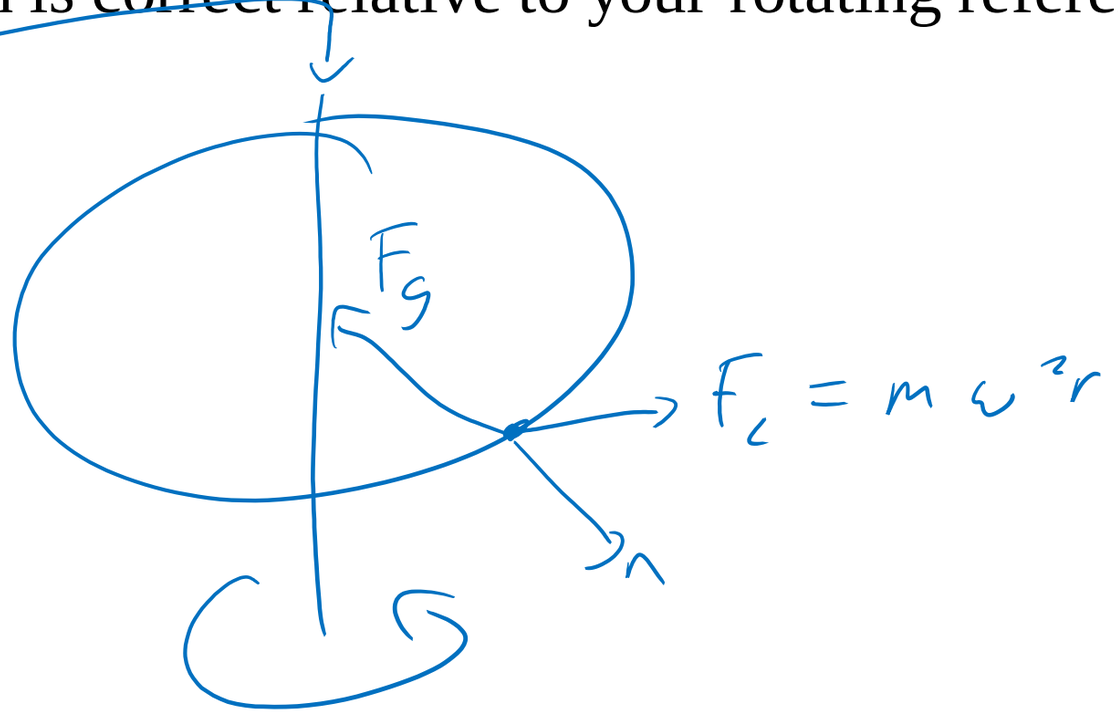
$R \sim 1.2\,m \rightarrow v \sim 3.5\,m/s$

FBD

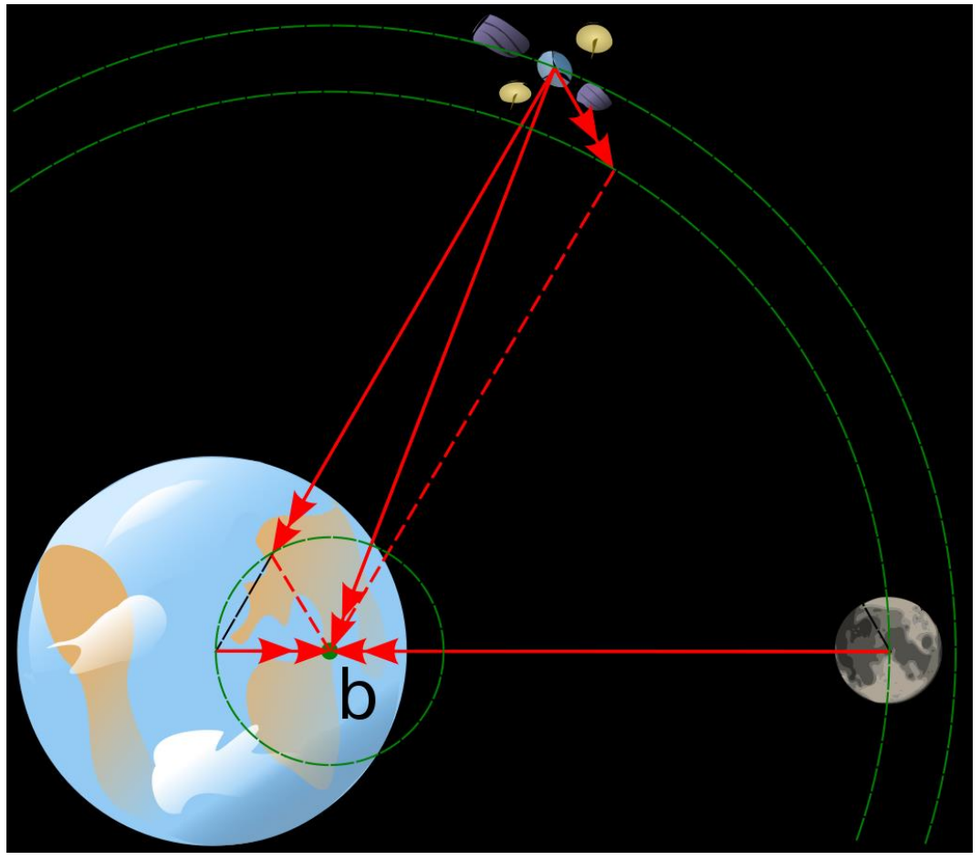


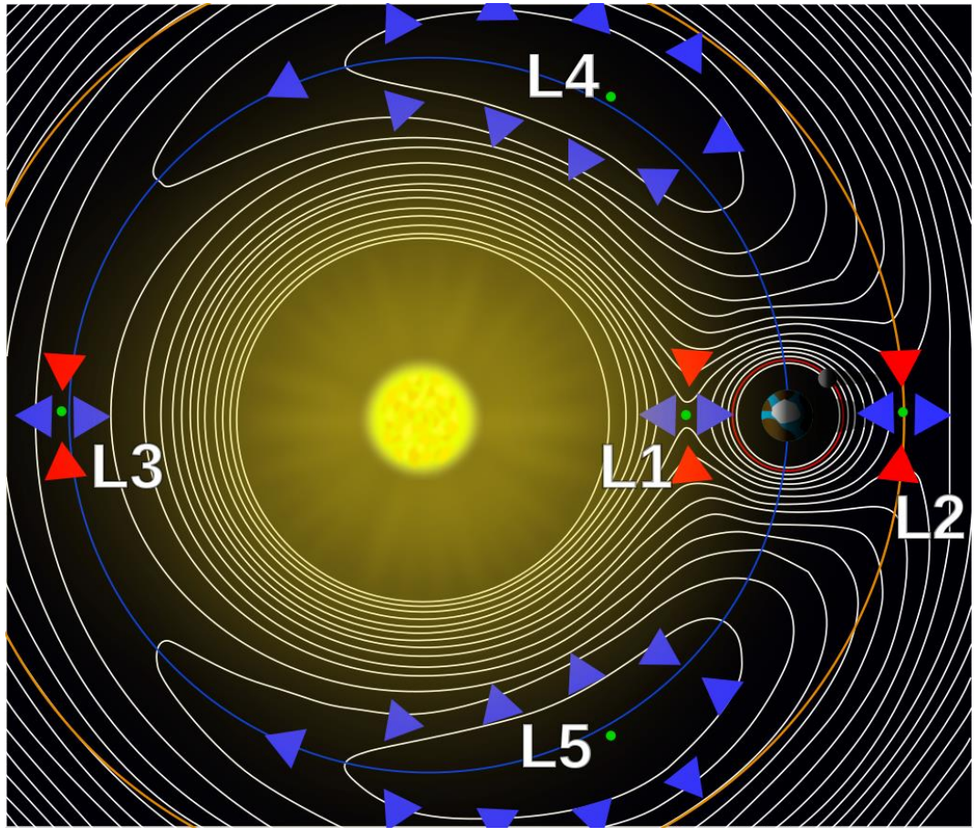
Centrifugal force

- Pick a rotating reference frame
- Find the axis of rotation
- Apply Newton's second law
- Add the Centrifugal force ($m\omega^2 r$ pointed away from axis)
- The resulting acceleration is correct relative to your rotating reference frame



What are Lagrange points?

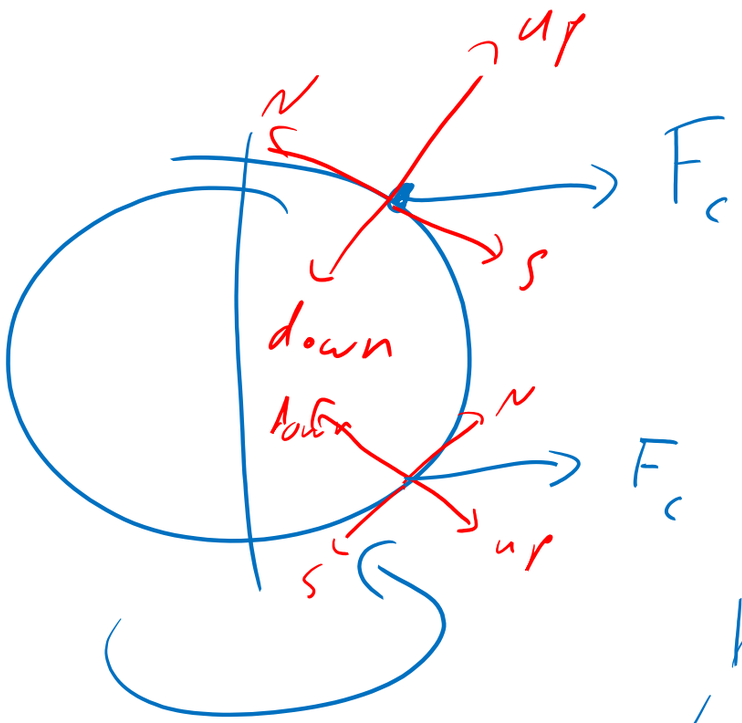




https://commons.wikimedia.org/w/index.php?curid=1079170

https://commons.wikimedia.org/w/index.php?curid=7547312

Team Up Questions



Known

$F_c = m\omega^2 r$

$360^\circ \rightarrow 2\pi$ rad

$24\,h \rightarrow (60)^2 \times 24$ s

$\frac{360^\circ}{24 \text{ hours}} \rightarrow \frac{\text{rad}}{\text{s}}$