Reminders 9-27-10:

-Quiz Wednesday on Chapter 4

-Next Homework Due September 28

-Update grades will be posted on Blackboard under the "Course Files" tab

-Tutors

-Exam 2 Ch 4-6 Mon. Oct. 18

Objectives:

-Newton's Laws + Examples

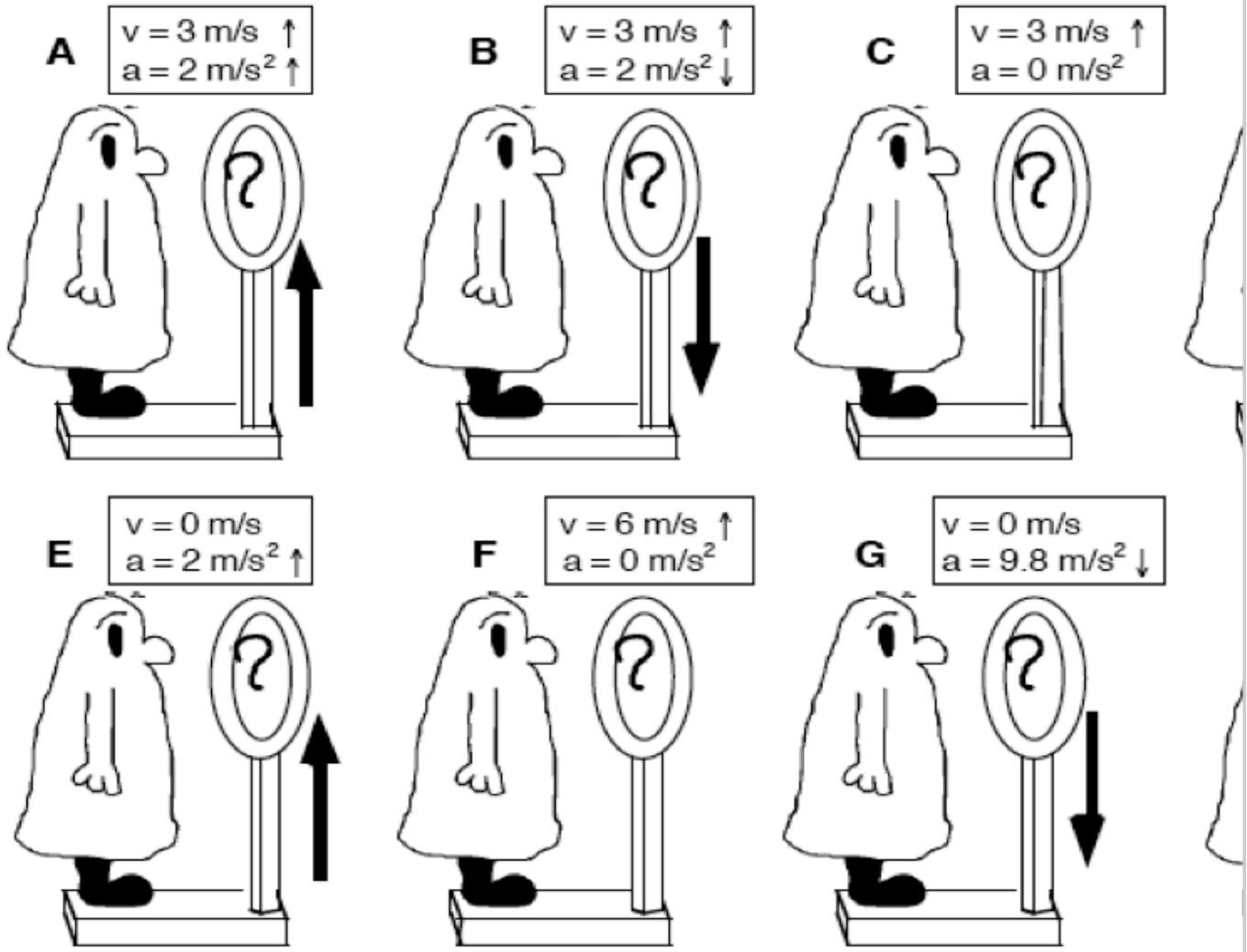
-Sliding Friction+ Examples

-Work

The figures below depict situations where a person is standing on a scal elevators. Each person weighs 600 N when the elevators are stationary. moves (accelerates) according to the specified arrow that is drawn next to it the elevator is moving, it is moving upward.

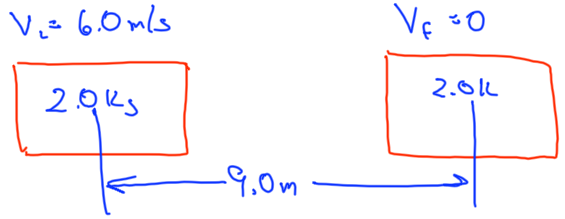
AE, CDF, B,

Rank the figures, from greatest to least, on the basis of the *scale weight* registered on each scale. (Use $g = 9.8$ m/s^2.)



A 2.0 kg block is given a push such that its initial velocity 6.0 m/s. It comes to a stop after traveling 9.0 m.

- **What is the object's acceleration?**
- **What is the frictional force acting on block?**
- **What is the coefficient of sliding friction?**



$$V_f^2 = V_i^2 + 2a\Delta x$$

$$0 = V_i^2 + 2a\Delta x$$

$$a = \frac{-V_i^2}{2\Delta x} = \frac{-(6.0\ m/s)^2}{2(9.0\ m)}$$

$$= -2.0\ m/s^2$$

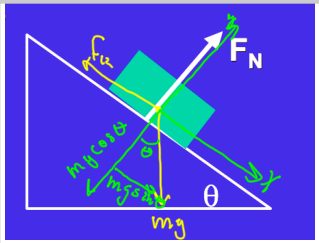
$$f_k = -\mu N = ma$$

$$= -\mu mg = ma \qquad a = \mu g$$

$$\mu_k = -\frac{a}{g} = -\frac{-2.0\ m/s^2}{9.80\ m/s^2}$$

$$\mu_k = 0.20$$

$$F = ma = (2\ kg)(-2.0\ m/s^2) = -4.0\ N$$



$\Sigma F_y = N - mg\cos\theta = 0$

$N = mg\cos\theta$

$\Sigma F_x = mg\sin\theta - f_k = ma$

$= mg\sin\theta - \mu N = ma$

$= mg\sin\theta - \mu mg\cos\theta = ma$

$a = g\sin\theta - \mu g\cos\theta$

Place block on hill an increase θ until it starts to move down hill. What is θ?

$mg\sin\theta - f_s = 0$

at breaking point

$mg\sin\theta - \mu_s N = 0$

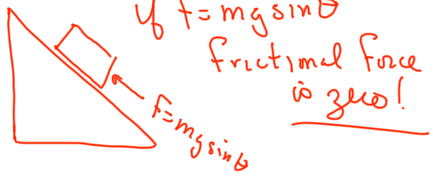
$mg\sin\theta - \mu_s mg\cos\theta = 0$

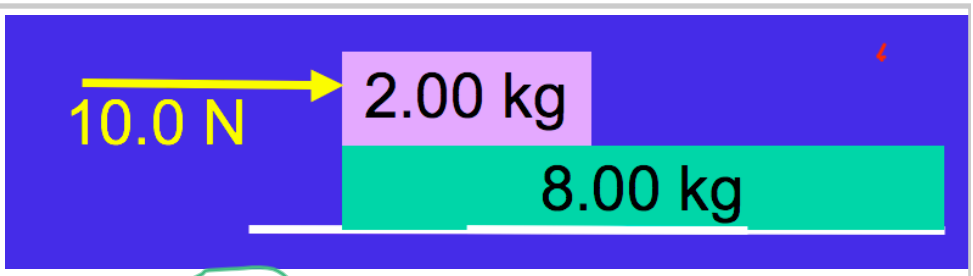
$\sin\theta - \mu_s\cos\theta = 0$

$\tan\theta = \mu_s$

$\theta = \tan^{-1}\mu_s$

If $f = mg\sin\theta$ frictional force is zero!





N_{21}

10N → 2.00 kg

f_K ← $m_1 g$

$\Sigma F_{x_1} = 10N - f_K = m_1 a_1$

$f_K = \mu_K N_{12} = \mu_K m_1 g$

$10N - \mu_K m_1 g = m_1 a_1$

$a_1 = \dfrac{10N - (0.3)(2.0)(9.80)}{2.0}$

$= 2.06 \text{ m/s}$

N_{12}

f_{12}

N_{TABLE}

8.00 kg

$m_2 g$

$f_K = (8.00)a = \mu m_1 g$

$a = \dfrac{(.3)(2.0kg)(9.80 \frac{m}{s^2})}{8.00} = .735 \frac{m}{s^2}$

- Examples of work
  - How much work is done in lifting a 1k
    1m? $W = mg\ 1m = 1(9.80)\ 1$
  - How much work is done on a wall if I
    for 1 minute? 5 minutes? 60 minutes?
  - How much work is done by the floor w
    jump? None
  - A horse pulls a cart with a force of 4.0
    What is the work done on the cart afte
    traveled 11 m? $(400\,N)(11m) = 44$

- **Examples of work**
  - How much work is done in lifting a 1
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    for 1 minute? 5 minutes? 60 minutes?
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  - A horse pulls a cart with a force of 4.
    What is the work done on the cart aft
    traveled 11 m? $(400N)(11m) = 44$
  - **A block is pulled with a force of 5.0 N**
    distance of 3 m. The frictional force a
    block is 3 N. What is the work done o

$W = (5N - 3N)(3m) = 6J$