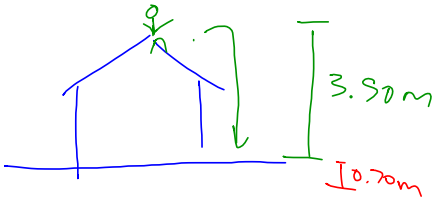
Review

A person jumps from the roof of a 3.90 m high house. When he hits the ground, he bends his knees so that his torso decelerates over an approximate distance of 0.70 m. If the mass of his torso, excluding his legs, is 42.0 kg, find the following:

A. His velocity just before hitting the ground.

B. The average force exerted on his torso by his legs during deceleration.

$m = 42.0\ kg$



$a = -9.8\ m/s^2$

$V_0 = 0\ m/s$

$y = -3.90\ m$

$V = ?$

$V^2 = V_0^2 + 2a(y - y_0)$

$V^2 = (0)^2 + 2(-9.8)(-3.90 - 0)$

$V = +/- 8.74\ m/s$

$V = -8.74\ m/s$

$V_0 = -8.74\ m/s$

$V = 0\ m/s$

$y = -0.7\ m$

$y = -0.1\ m$

$F = ma$

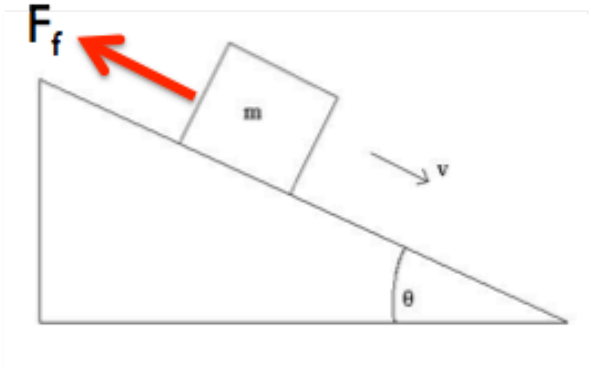
$V^2 = V_0^2 + 2a(y - y_0)$

$a = 54.6\ m/s^2$

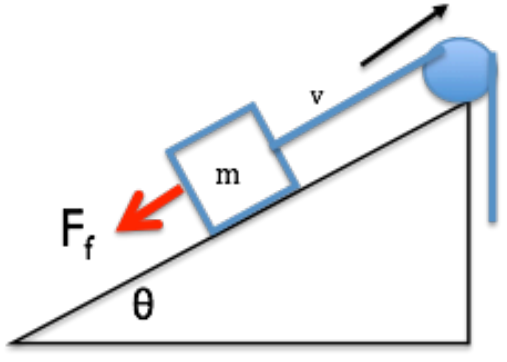
$a = 382.2\ m/s^2$

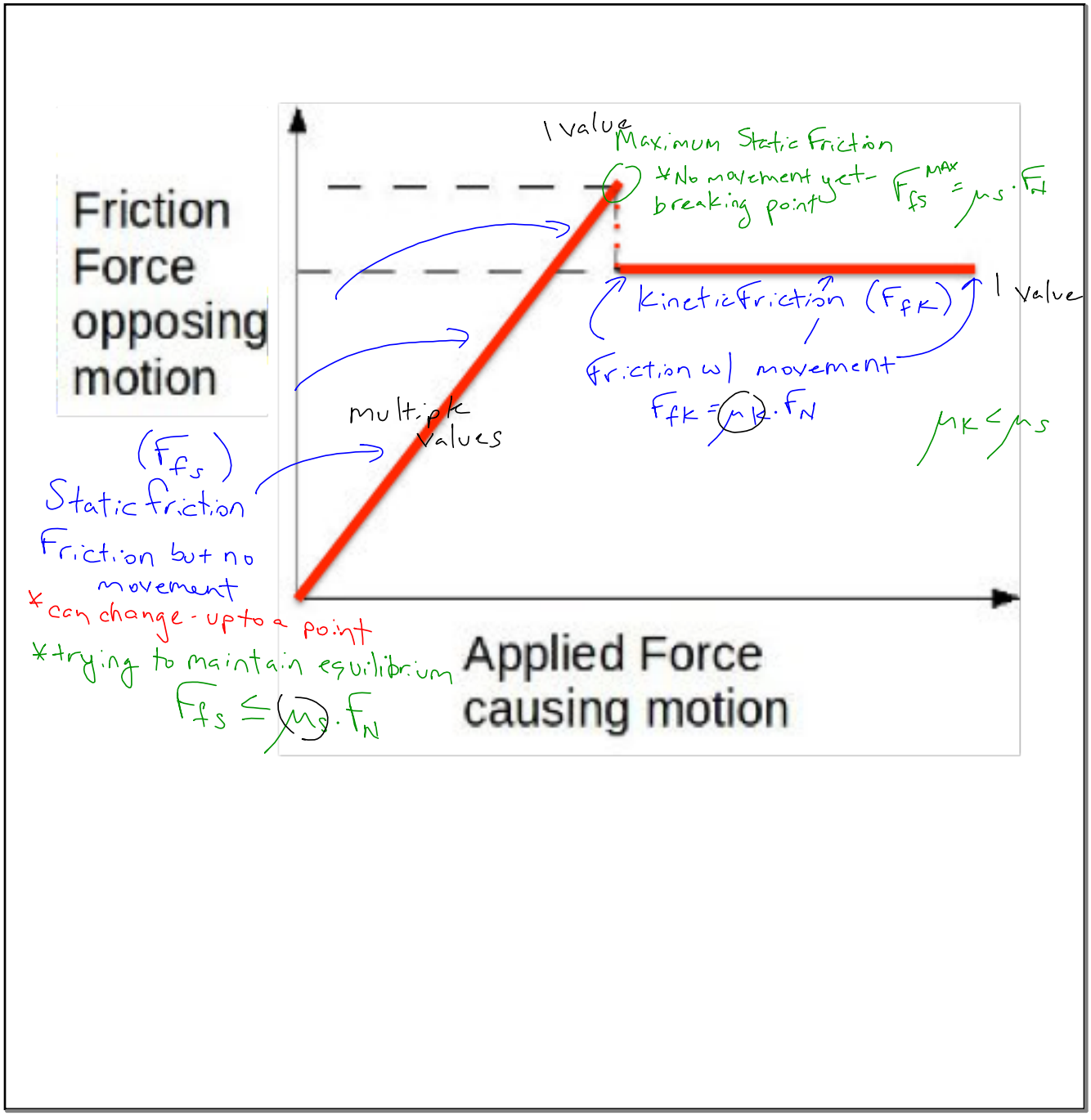
- Friction - *resistive* force created by contact between two surfaces.
  - Always **opposes** motion
  - Always **parallel** to the surface

- Example 1



- Example 2




Friction Force opposing motion
1 value
Maximum Static Friction
*No movement yet- breaking point
$F_{fs}^{MAX} = \mu_s \cdot F_N$
Kinetic friction (F_{fK})
1 value
Friction w/ movement
$F_{fK} = \mu_k \cdot F_N$
$\mu_K < \mu_s$
multiple values
(F_{fs})
Static friction
Friction but no movement
*can change - upto a point
*trying to maintain equilibrium
$F_{fs} \leq \mu_s \cdot F_N$
Applied Force causing motion