Raw Data Sheet

Student Name: _____

Team members:
1.- _____   2.- _____

3.- _____   4.- _____

Instructor: _____

Velocity and Acceleration of Students

How does your motion correspond to the readings on the graph? Does the motion sensor read negative when you approach or when you walk away?

 Motion towards the sensor is recorded as being in a negative direction (and gives a negative velocity), while motion away from the sensor is recorded as being in the positive direction (and gives a positive velocity).

Acceleration Along an Air Track

Record the mass of the car and of the weight as instructed in the manual. Record the slope of the velocity plot. Make one printout per group to be handed in, and note down the section title. Include units.
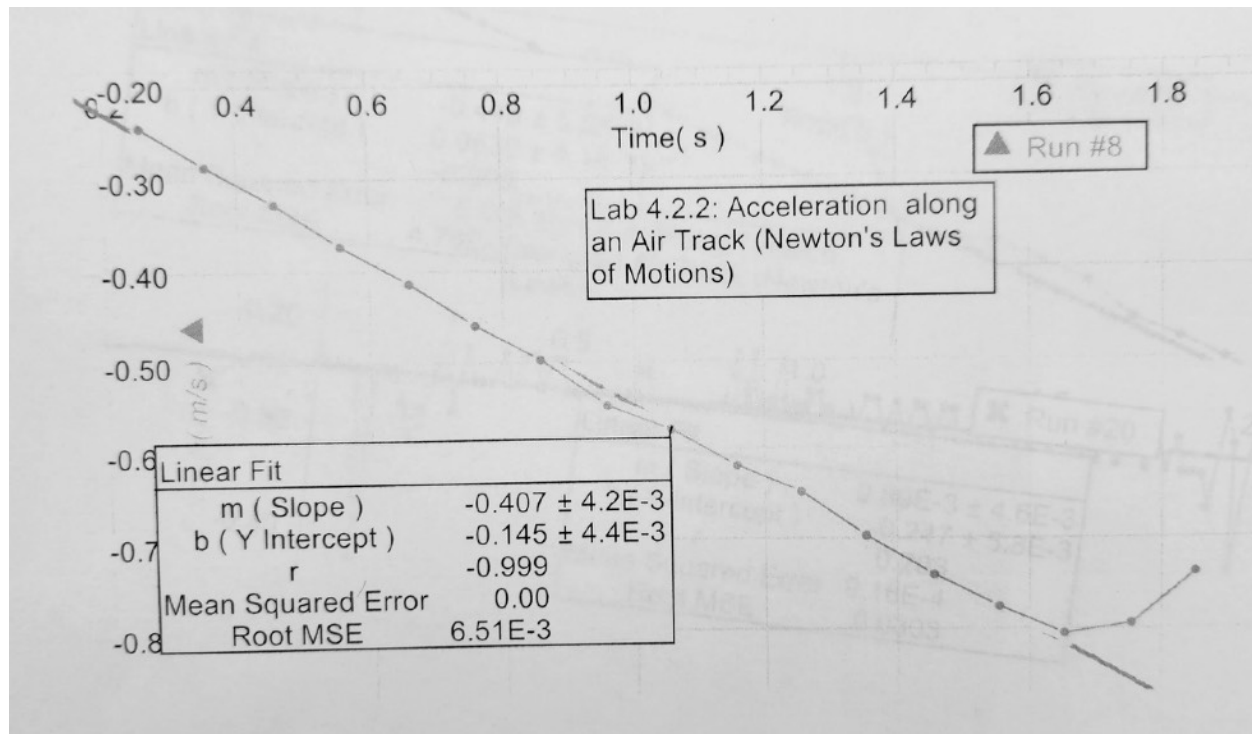
m_1 (mass of the cart): ___391.2 g___

m_2 (mass of the hanging weight): ___25.4 g___

Slope: ___-0.384 m/s^2___

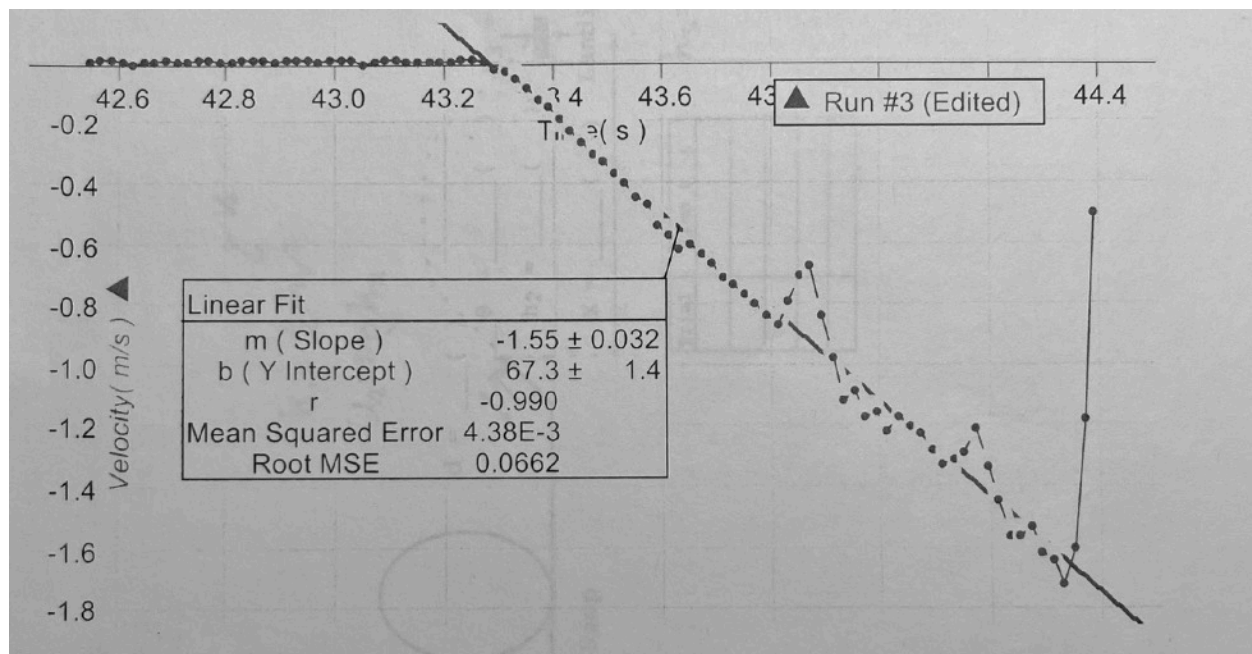Plot(v vs. t): ▭

String Tension Along an Air Track

Record the mass of the car and of the weight as instructed in the manual. Record the slope of the velocity plot and the value of the tension. Make one printout (per plot) per group to be handed in, and note down the section title. Be sure to write down the units.

m_1 (mass of the cart with the force sensor): ___487.5 g___

m_2 (mass of the hanging weight): ___100 g___

Slope: ___-1.55 m/s^2___

Tension: ___-0.45 N___

Plot (v vs. t): ▭
Plot (F vs. t): ▭

Acceleration along an air track: Velocity (m/s) vs. Time (s)

Lab 4.2.2: Acceleration along an Air Track (Newton's Laws of Motions)

Run #8

Time(s)

(m/s)

Linear Fit	
m (Slope)	-0.407 ± 4.2E-3
b (Y Intercept)	-0.145 ± 4.4E-3
r	-0.999
Mean Squared Error	0.00
Root MSE	6.51E-3

String Tension Along an Air Track: Velocity (m/s) vs. Time (s)

Run #3 (Edited)

Time(s)

Velocity(m/s)

Linear Fit	
m (Slope)	-1.55 ± 0.032
b (Y Intercept)	67.3 ± 1.4
r	-0.990
Mean Squared Error	4.38E-3
Root MSE	0.0662

String Tension Along an Air Track: Force (N) vs. Time (s)

Run #3 (Edited)

Linear Fit	
m (Slope)	-1.71E-3 ± 0.023
b (Y Intercept)	-0.450 ± 1.0
r	-0.0127
Mean Squared Error	7.34E-4
Root MSE	0.0271

Let go of car, m_2 falling

Holding car in place w/ m_2 hanging
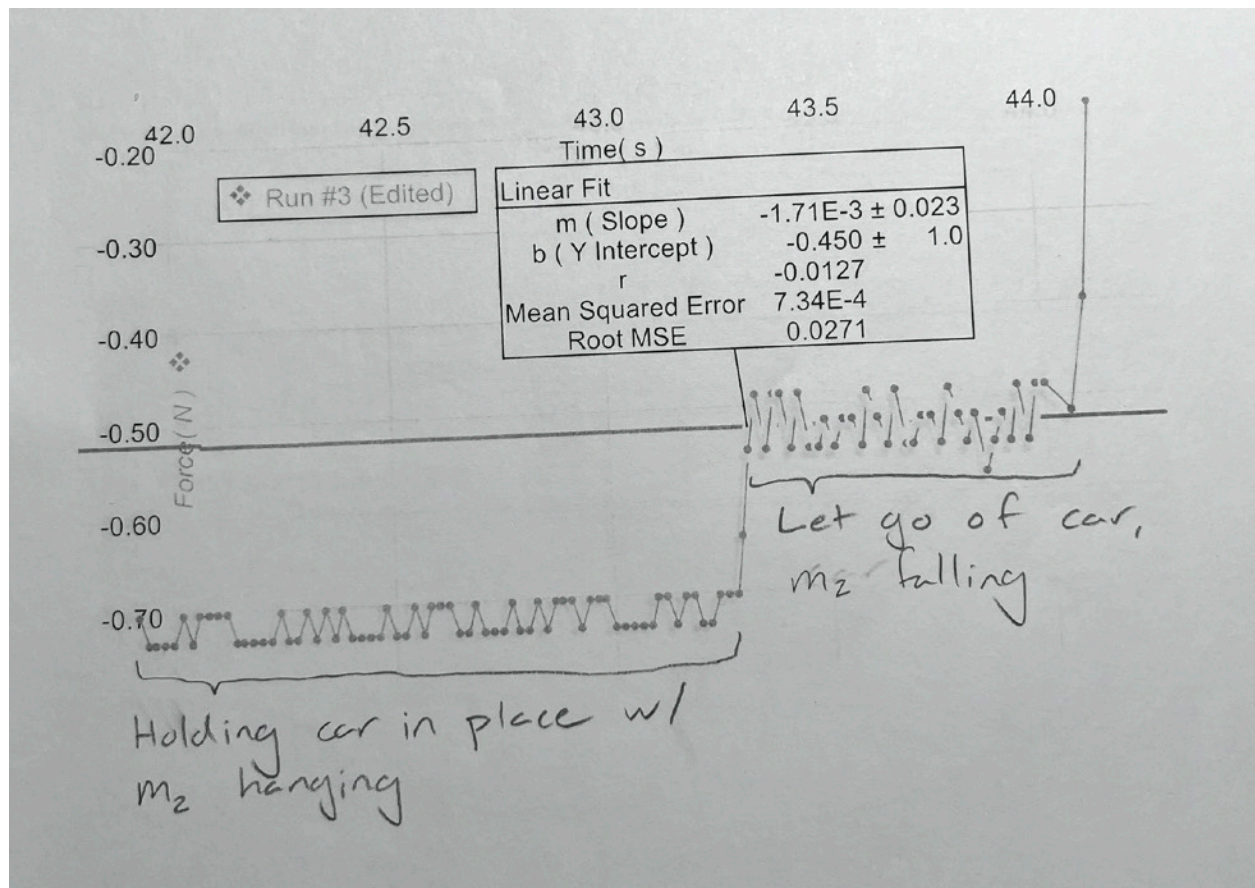
Raw Data Sheet

Student Name: _____

Team members:
1.- _____   2.- _____

3.- _____   4.- _____

Instructor: _____

Acceleration Through an Atwood Machine

Record the masses of each trial, and record the slope of the velocity curve. Make one printout per group to be handed in, and note down the section title. Be sure to write down the units.

Trial 1: m_1: __0.250 kg__ m_2: __0.260 kg__   Slope: __$1.86 \pm 4.2\text{E-3}$__ Plot(v vs. t): ☐

Trial 2: m_1: __0.250 kg__ m_2: __0.270 kg__   Slope: __3.13 ± 0.012__ Plot(v vs. t): ☐

Trial 3: m_1: __0.250 kg__ m_2: __0.280 kg__   Slope: __4.40 ± 0.012__ Plot(v vs. t): ☐

Static Friction on a Horizontal Surface

Record the type of surface and the maximum force applied before the 2 kg mass started to move. Make one printout per group to be handed in, and note down the section title along with corresponding surface. Include units.

Surface: __Plastic__   Surface: __Tile__

Maximum force: __4.73 N__   Maximum force: __8.03 N__

Plot (F vs. t): ☐   Plot (F vs. t): ☐

Kinetic Friction on an Inclined Surface

Record the mass of the wooden block, the inclination angle and the slope of the velocity curve. Make one printout per group to be handed in, and note down the section title. Be sure to write down the units.

m_{block}: __102.7 g__

Angle: __25°__

Slope: __1.42 ± 0.086__

Plot (v vs. t): ☐