

Name:

Student ID:

## Physics 9HA DL #09 Lab Report

### I. Data Analysis

1. Fill in the table below. In the space below the tables, explain how you compute the quantities for each case. This explanation should include the free-body diagrams and derivations of the equations you use in each case.

run	$m$	$y$	$\theta$	$\mu_S$
1	0.331 kg	0.08 m		
2	0.360 kg	0.13 m		
3	0.380 kg	0.16 m		
4	0.427 kg	0.21 m		
			$\langle \mu_S \rangle$	
			$\sigma(\mu_S)$	$\pm$

*other  
measurements:*

$$L = 0.31 \text{ m}$$

$$M = 0.364 \text{ kg}$$

run	$y$	$\theta$	$\mu_S$
1	0.170 m		
2	0.165 m		
3	0.170 m		
4	0.160 m		
		$\langle \mu_S \rangle$	
		$\sigma(\mu_S)$	$\pm$

2. Determine whether the two experiments are in agreement with each other, to within uncertainty. Briefly explain.

## II. Questions

3. Show that the percentage uncertainty in height measurements for the second experiment are smaller than the percentage uncertainty of the coefficient of static friction in that experiment, implying that some random error in the condition of the surface is introduced between runs that cannot be accounted for by propagating measurement uncertainties.

4. Discuss any additional sources of error (beyond those mentioned above) that you think might exist for these experiments as they are designed. Suggest ways that these errors might be mitigated.