Physics Laboratory Report
Rolling Motion

Name _____   Date_____

Lab Partner _____

Definitions
a: linear acceleration of the center of the hoop
α: angular acceleration of the hoop about the center
R: radius of hoop, measured or from fitting function
ϕ: tilt angle of ramp, relative to horizontal
h: height of ramp end above floor, used to compute ϕ
L: total length of ramp, used to compute ϕ

Preliminary analysis
Attach a separate sheet with your derivations of the following quantities needed for data analysis:
    (a) a and α as a function of tilt angle and other known parameters, both above and below the critical angle
    (b) $a/\alpha R$ both above and below the critical angle

Data acquisition
        R _____ L _____

h	a	α	R	ϕ	$a/\alpha R$

Attach an example of the data and fits used to find a and α. Are the accelerations constant as expected?

Data analysis
Plot $a/\alpha R$ vs tan ϕ, and determine the critical angle for slipping.

Is a plot of a vs sin ϕ linear below the critical angle, with the expected slope?

Is a plot of α vs cos ϕ linear above the critical angle? Is the value of μ deduced from the slope reasonable?

Attach the plots to your report to support your analysis.

Are your results consistent with the model of rolling suggested in the lab manual?