Hot Wheels Kinematics Lab 1 Name: _______________________

Materials: long straight ramp, hot wheels car, stop watch, meter stick, calculator

Instructions:

Part 1

Begin by measuring the diagonal length of the ramp from where the car begins until where it reaches the bottom. You must be consistent throughout the experiment about where the car begins and ends.

Distance of the car's diagonal path: ________ meters

Measure and record the amount of time it takes the car to travel down the ramp. Complete three trials and write the times in the spaces below. Find the average of the three trails.

$t_1 =$ ________ $seconds$ $t_2 =$ ________ $seconds$ $t_3 =$ ________ $seconds$

$$t_{average} = \frac{t_1 + t_2 + t_3}{3} = \_\_\_\_\_\_\_\_ \quad seconds$$

Determine the acceleration of the hot wheels car in m/s/s by using the information you have gathered about distance and time. You will need the following kinematic equation: $\Delta x = v_i t + \frac{1}{2}\bar{a}t^2$

Hint: distance = $\Delta x$ and $v_i = 0\frac{m}{s}$. $\bar{a} =$ ____________ m/s/s Show your work.

Determine the final velocity of the car at the bottom of the ramp in two ways. Show your work.

1. Use $v_f = \bar{a}$t + $v_i$
2. Use $v_f^2 = v_i^2 + 2\bar{a}\Delta x$

$v_f$ =________ m/s

$v_f$ =________ m/s

3.

Check your final velocity by calculating the distance traveled using $\bar{v} = \frac{v_f + v_i}{2}$ and $\Delta x = \bar{v}t$ to verify the calculated distance is the same as the distance you measured at the beginning of the lab.

4. Create stacked kinematic graphs of the car's motion.  Qualitative graphs on the left, quantitative on the right.  Be sure to use equal interval lengths when creating the quantitative graphs on the right.

Assume the top of the ramp is 0 meters and down the ramp is the positive direction.