

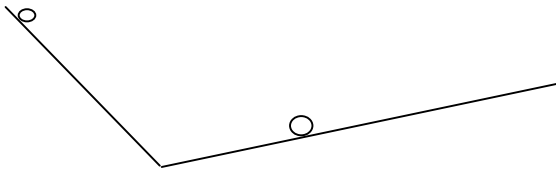
NAME(s) _____

BALLS COLLIDE (HONORS)

1) Where to make them collide?

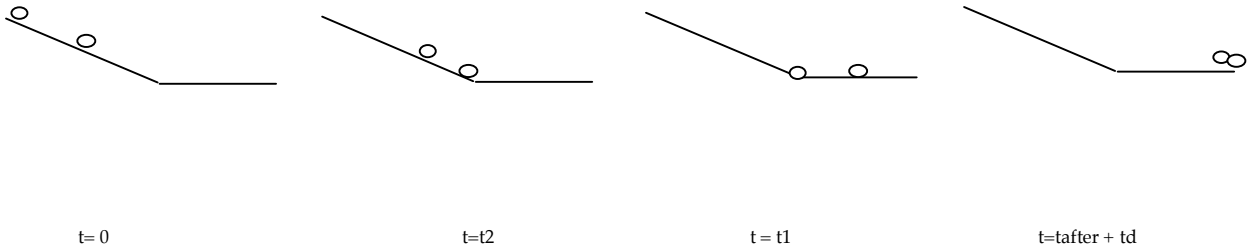
You are given two ramps at different slope facing one another. (A short ramp at a steep angle, and a long ramp at a shallower angle) You are given a ball. You will roll the ball down each ramp and make measurements. Then the balls will be taken away from you. Using only your information and formulas, predict where to put TWO balls, one on each ramp, so they will collide at the bottom (when let go at the same time). Have teacher verify results.

Hint: Get acceleration of each ramp first. $V_i=0$, $A=2D/T^2$.



2) Where will they collide????

You are given one ball and a ramp. You will roll the ball down the ramp and make measurements. THEN, you will be given a second ball. BEFORE you are given the second ball, you will be asked to predict where a ball from the top and the middle of the ramp will collide along the floor, if at all. Show your work and calculations. (HINT: you can use algebra, calculus, or the good old graphing method. Assume that the ball after the ramp goes a constant speed $D=VfT$). Have teacher verify results



two equations, two unknowns, solve for distance after ramp, or time after ramp . **** Extra, use algebra to show that

you never even needed to time anything!

MEASUREMENTS:

D_1 = TOTAL DISTANCE on ramp for Ball1

T_1 = Time for ball 1

**Calculations (in order):

A = Acceleration of ramp (both balls)

V_{f1} =Final velocity ball1 on ramp=velocity on floor ball1

D_2 = distance on ramp ball 2 ($=1/2D_1$)

T_2 =time on ramp ball2

V_{f2} =Final velocity ball2 on ramp=velocity on floor ball2

T_D =time difference.... =time ball 2 spent on floor before ball1 on floor D_{f2} = distance ball 2 on floor before ball2

T = time ball1 on floor (1 unknown), D = distance ball1 on floor (2nd unknown) 2 equations and 2 unknowns! (T ? and D ? time and dis ball1 on floor)

