

X1.0a

Physics 109 (Kaldon)

WMU - Fall 1997

Exam 0 - 000,000 points

107

Name _____

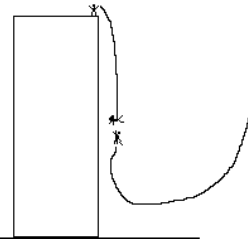
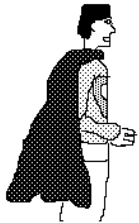
Book Title _____

Section:	1a	1b	1c	2a	2b	2c	2d
	11:00Mon	12:00Tue	1:00Thu	10:00Wed	2:00Wed	3:00Tue	3:00Thu

State Any Assumptions You Need To Make -- Show All Work -- Circle Any Final Answers
Use Your Time Wisely - Work on What You Can - Be Sure to Write Down Equations
BOLDFACE Variables Are Vectors - Feel Free to Ask Any Questions

“Man of Steel, Woman of Kleenex™” (50,000 points)

1.) The evil Lex Luthor drops Lois Lane ($m = 50 \text{ kg}$) off the top of a 222 m tall building. Superman ($m = 300 \text{ kg}$) flies in to thwart his dastardly deed and catches Lois halfway to the ground. Find Lois Lane’s vector velocity just before Superman catches her. Assume $v_x = 0$.



*No Cartoon Characters Were Harmed in the Making of this Problem.

(b) Superman is traveling at $v = 100 \text{ m/s}$ @ 90° just before he catches Lois. What is Lois’ speed relative to the Man of Steel?

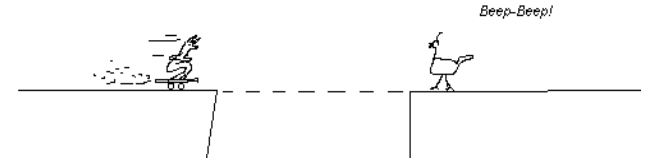
(c) Find Lois’ change in speed, Δv , as she goes from falling down to traveling up with Superman at $v = 100 \text{ m/s}$ @ 90° .

(d) Lois goes from v_{down} to v_{up} in just a short distance of 10.0 cm . Find the magnitude of the acceleration that Superman applies to Lois Lane as he smashes into her from below. *Ooooh, that’s gotta hurt!* (Now you know where the title of the problem came from.) Is this a big acceleration or not? Explain.

(e) Find the magnitude of the force, F_1 , that Superman applies to Lois Lane, and the magnitude of the force, F_2 , that Lois Lane applies to Superman.

Physics – Chuck Jones Style (50,000 points)

2.) In a popular series of cartoons, Wile E. Coyote (*canus hungrius*) is forever trying to capture the Road Runner (*birdus fastus*). Using a set of Acme™ Rocket Powered Roller Skates, the Coyote will attempt to leap the 40.0 m wide gorge while traveling at a constant horizontal speed of 20.0 m/s.
 (a) How long does it take for the Coyote to cross the gap?

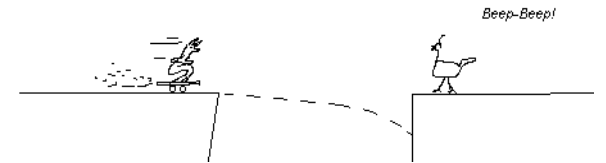


(b) Now to properly cross the gap, the Coyote needs to jump up at v_{0y} , so that he will land at the same height on the other side. How fast is v_{0y} ?



(c) Now that you have v_{0x} and v_{0y} , you can find the magnitude and standard angle of the vector velocity, \vec{v}_0 .

(d) Unfortunately, this is a Coyote & Road Runner cartoon, so the Coyote forgets to jump up. Instead, find the distance he falls before he runs into the canyon wall.



(e) It is 1234 m to the bottom of the gorge. How long will it take for the Coyote to hit bottom?

