

Name: _____

Per: _____

The Motorcycle Mishap

In an attempt to clarify the laws of physics for his students, Mr. Ronneberg rides his new(ish) motorcycle off the roof of the science building. (Hey no one ever said physics teachers were smart)

a) Draw a picture below showing what you think the path of the Ronny's flight would look like. Draw velocity vectors at 3 places along the flight path, and show the horizontal and vertical components of each vector.

b) Aside from wind resistance, what are all the forces acting on Ronny and the bike? Draw a freebody diagram below:

c) Consider the horizontal and vertical components of Ronny's velocity separately.
Does his horizontal velocity change or remain constant? Why?

Does his vertical velocity change or remain constant? Why?

d) Does the speed with which Ronny leaves the roof effect how LONG (in seconds) it takes him to hit the ground? Will it effect WHERE he hits the ground? Why or why not?

e) Try to write an equation which describes his horizontal velocity as a function of time, and an equation which describes his vertical velocity as a function of time. How about equations (functions of time) for his horizontal and vertical position?

Horizontal Velocity	Horizontal Position
Vertical Velocity	Vertical Position

Projectile Goalie

Javier is playing goalie in a soccer game. He notices that every time he drop-kicks the ball it stays in the air for a long time, but doesn't go very far.

- a) How can Javier get more distance out of his kick without kicking it harder?
- b) Explain your answer using vector components (use pictures and words)
- c) What variables can Javier directly control that effect how far the ball goes?
- d) If we call the distance the ball goes "R", what is the relationship between the variables you identified in step c and R? represent the relationships in graphical form.