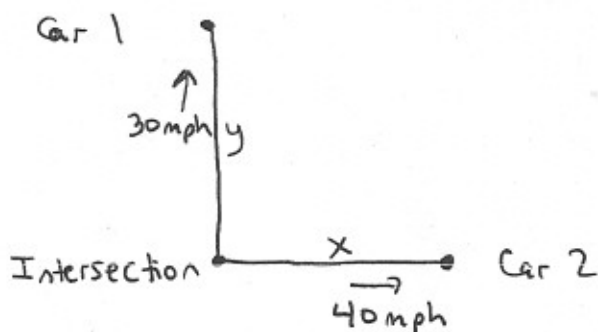


NAME: KEY

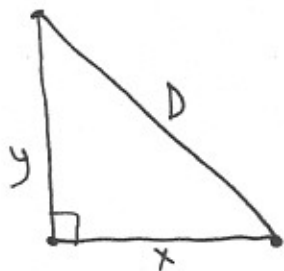
YOUR GRADE IS BASED ON THE PROCESS AS WELL AS THE FINAL RESULT. SHOW ALL YOUR STEPS CLEARLY SO YOU WILL BE ELIGIBLE FOR THE MOST PARTIAL CREDIT. YOU MAY USE A CALCULATOR, BUT NO NOTES, BOOKS, OR OTHER STUDENTS. GOOD LUCK!

1.) (10 pts.) Two cars leave an intersection simultaneously. One travels north at 30 mph, and the other travels east at 40 mph.

a.) (4 pts.) Draw a picture showing the intersection and the paths of the two cars.



b.) (3 pts.) Suppose the distance from the intersection to the first car (the one traveling north) is represented by y and the distance from the intersection to the second car (the one traveling east) is represented by x . Write an equation relating x , y , and the distance D between the two cars.



$$x^2 + y^2 = D^2$$

c.) (3 pts.) Compute the derivative of your equation in part (b), with respect to time.

$$2x \frac{dx}{dt} + 2y \frac{dy}{dt} = 2D \frac{dD}{dt}$$