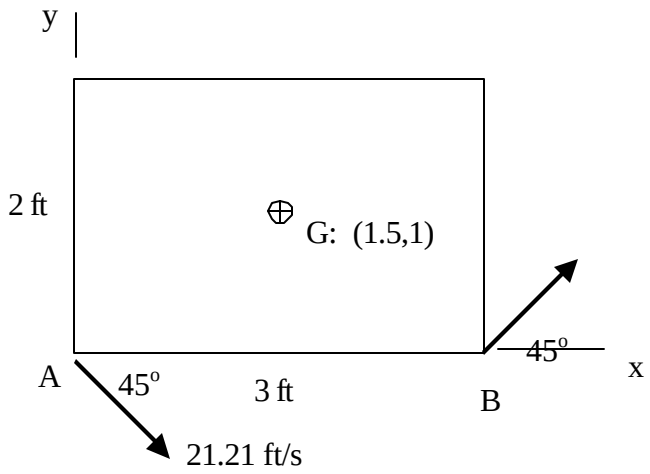
Name _____ 30 pts

ES204 Examination II **Problem 1** Jan. 21, 2000

The rectangular 3 ft x 2 ft plate has mass of 3 slugs. Its moment of inertia about mass center G is 3.25 slug-ft^2. As the plate experiences general plane motion, the velocities of corners A and B have the directions indicated. The velocity of A is $15\sqrt{2}$ or 21.21 ft/s.



Calculate the following system variables and properties. Give units. For full credit, show all work.

a) The location of the instant center of rotation using the x-y coordinates shown.

b) The angular velocity of the plate. Magnitude and direction.

c) The linear momentum vector for the plate. Magnitude and direction.

d) The angular momentum of the plate about G. Magnitude and direction.

e) The angular momentum of the plate about A. Magnitude and direction.

f) The kinetic energy of the plate.

Name _____ 30 pts

ES204 Examination II **Problem 2** Jan. 21, 2000

The slender bar of mass m = 1.2 kg and length L = 2 m is released from rest in the horizontal position shown. If point A of the bar becomes attached to the pivot at B upon impact, determine immediately after the impact:

a) the angular velocity, ω, of the bar
b) the impulse exerted on the rod at A during the impact.

Save the numerical calculations until the end of the exam to make sure you get a solution to all the other problems.