PHYS 172 Problem of the Week 6 – Spring 2012

Jack and Jill are maneuvering a 3000 kg boat near a dock. Initially the boat's position is <2, 0, 3> m and its speed is 1.3 m/s. While the boat moves to position <4, 0, 2> m, Jack exerts a force <–400, 0, 200> N and Jill exerts a force <150, 0, 300> N.

(a) How much work does Jack do?

(b) How much work does Jill do?

(c) Assuming that we can neglect the work done by the water on the boat, what is the final speed of the boat?

(d) Suppose that the boat moved from its initial position to its final position along a straight line. Without doing any geometrical calculations, say what is the angle between the (vector) force that Jill exerts and the (vector) velocity of the boat. Explain briefly how you know this.

(e) What effect does Jill have on the boat's motion?