Honors Physics 2D Kinematics HW, part 1 (Homework)

For help with these problems
www.tutor-homework.com
Be sure to mention the filename:
Physics_Questions_0045

www.tutor-homework.com (for tutoring, homework help, or help with online classes)

1.
A dog searching for a bone walks 3.00 m south, then 8.20 m at an angle 30.0° north of east, and finally 14.0 m west. Find the dog's resultant displacement vector using graphical techniques.
Magnitude:
Direction:

2.
A man lost in a maze makes three consecutive displacements so that at the end of the walk he is right back where he started. The first displacement is 3.00 m westward, and the second is 16.0 m northward. Find the magnitude and direction of the third displacement, using the graphical method.
Magnitude:
Direction:

3.
A girl delivering newspapers covers her route by traveling 8.00 blocks west, 4.00 blocks north, then 2.00 blocks east.
(a) What is her resultant displacement?
(b) What is the total distance she travels?

4.
Two people pull on a stubborn mule, as seen from a helicopter in Figure P3.14. Assume that F_1 is 110 N and F_2 is 85 N. (Figure is on next page.)

(a) Find the single force that is equivalent to the two forces shown.
Magnitude:
Direction:
(b) Find the force that a third person would have to exert on the mule to make the net force equal to zero.
Magnitude:
Direction:

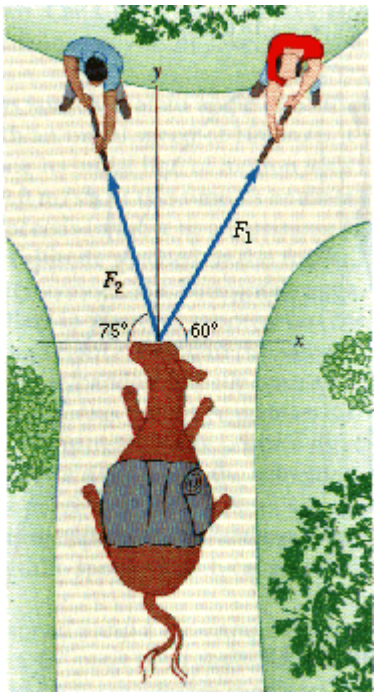

Figure P3.14.

5.
A man pushing a mop across a floor causes it to undergo two displacements. The first displacement has a magnitude of 210 cm and makes an angle of 130° with the positive *x* axis. The resultant displacement has a magnitude of 210 cm and is directed at an angle of 55.0° to the positive *x* axis. Find the magnitude and direction of the second displacement.
Magnitude:
Direction:

6.
Tom the cat is chasing Jerry the mouse across a table surface 1.3 m off the floor. Jerry steps out of the way at the last second, and Tom slides off the edge of the table at a speed of 6.3 m/s. Where will Tom strike the floor, and what velocity components will he have just before he hits? (*Use a coordinate system in which up is positive.*)

7.
A brick is thrown upward from the top of a building at an angle of 20° to the horizontal and with an initial speed of 12 m/s. If the brick is in flight for 3.1 s, how tall is the building?

8.
A car is parked on a cliff overlooking the ocean on an incline that makes an angle of 16.0° below the horizontal. The negligent driver leaves the car in neutral, and the emergency brakes are defective. The car rolls from rest down the incline with a constant acceleration of 2.59 m/s^2 for a distance of 60.0 m to the edge of the cliff. The cliff is 20.0 m above the ocean. Find
(a) the car's position relative to the base of the cliff when the car lands in the ocean, and
(b) the length of time the car is in the air.
9.
A projectile is launched with an initial speed of 75 m/s at an angle of 20° above the horizontal. The projectile lands on a hillside 4.0 s later. Neglect air friction.

(a) What is the projectile's velocity at the highest point of its trajectory?
(b) What is the straight-line distance from where the projectile was launched to where it hits?

10.

A quarterback throws a football toward a receiver with an initial speed of 20 m/s, at an angle of 30° above the horizontal. At that instant, the receiver is 20 m from the quarterback. In what direction and with what constant speed should the receiver run in order to catch the football at the level at which it was thrown?

11.

A 2.00 m tall basketball player wants to make a goal from 10.0 m from the basket, as in Figure P3.46. If he shoots the ball at a 45.0° angle, at what initial speed must he throw the basketball so that it goes through the hoop without striking the backboard?