Chapter 5 WS # 1 Pr: 1,2,3,8,15,19,21,23

Problems

1. A woman weighs 120 lb. Determine (a) her weight in newtons and (b) her mass in kilograms.

2. If a man weighs 900 N on the Earth, what would he weigh on Jupiter, where the free-fall acceleration is 25.9 m/s^2?

3. W A 3.00-kg object undergoes an acceleration given by $\vec{\mathbf{a}} = (2.00\hat{\mathbf{i}} + 5.00\hat{\mathbf{j}})$ m/s^2. Find (a) the resultant force acting on the object and (b) the magnitude of the resultant force.

8. (a) A car with a mass of 850 kg is moving to the right with a constant speed of 1.44 m/s. What is the total force on the car? (b) What is the total force on the car if it is moving to the left?

15. Two forces, $\vec{\mathbf{F}}_1 = (-6.00\hat{\mathbf{i}} - 4.00\hat{\mathbf{j}})$ N and $\vec{\mathbf{F}}_2 = (-3.00\hat{\mathbf{i}} + 7.00\hat{\mathbf{j}})$ N, act on a particle of mass 2.00 kg that is initially at rest at coordinates (−2.00 m, +4.00 m). (a) What are the components of the particle's velocity at $t = 10.0$ s? (b) In what direction is the particle moving at $t = 10.0$ s? (c) What displacement does the particle undergo during the first 10.0 s? (d) What are the coordinates of the particle at $t = 10.0$ s?

19. M Two forces $\vec{\mathbf{F}}_1$ and $\vec{\mathbf{F}}_2$ act on a 5.00-kg object. Taking $F_1 = 20.0$ N and $F_2 = 15.0$ N, find the accelerations of the object for the configurations of forces shown in parts (a) and (b) of Figure P5.19.

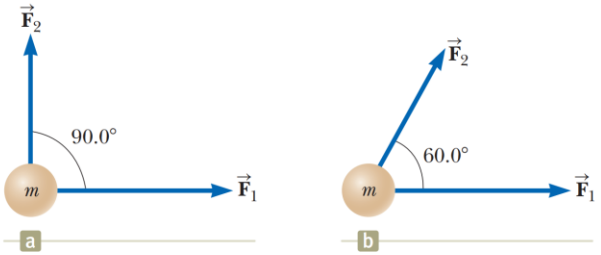

Figure P5.19

21. A 15.0-lb block rests on the floor. (a) What force does the floor exert on the block? (b) A rope is tied to the block and is run vertically over a pulley. The other end is attached to a free-hanging 10.0-lb object. What now is the force exerted by the floor on the 15.0-lb block? (c) If the 10.0-lb object in part (b) is replaced with a 20.0-lb object, what is the force exerted by the floor on the 15.0-lb block?

23. A 1 000-kg car is pulling a 300-kg trailer. Together, the car and trailer move forward with an acceleration of 2.15 m/s^2. Ignore any force of air drag on the car and all friction forces on the trailer. Determine (a) the net force on the car, (b) the net force on the trailer, (c) the force exerted by the trailer on the car, and (d) the resultant force exerted by the car on the road.

1) 534 N, 54.5 kg 2) 2.38 kN 3) (6i + 15j) N 8) 0 15) (-45i + 15j) m/s, 162o, (-225i + 75j) m, (-227i +79j)m
19) 5m/s^2 at 36.9°, 6.08 m/s^2 at 25.3° 21) 15 lb, 5 lb, 0 23) 2.15×10^3 N, 645 N, 1.02×10^4 N at -74.1°