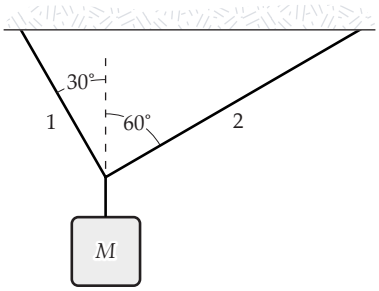
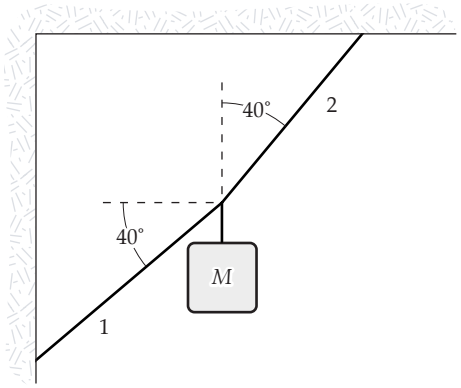
3. If $M = 6.0$ kg, what is the tension in string 1?



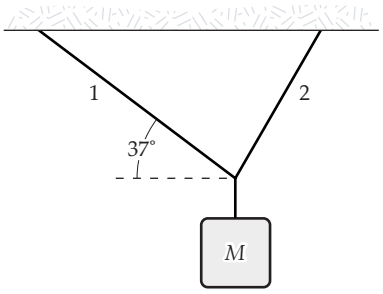
a. 39 N
b. 34 N
c. 29 N
d. 44 N
e. 51 N

4. If $M = 1.1$ kg, what is the tension in string 1?



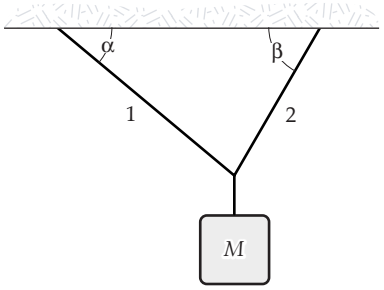
a. 54 N
b. 47 N
c. 40 N
d. 62 N
e. 57 N

5. An object of unknown weight is suspended as shown. The tension in rope 1 is 25 lb, and the tension in rope 2 is 31 lb. What is the weight of the suspended object?



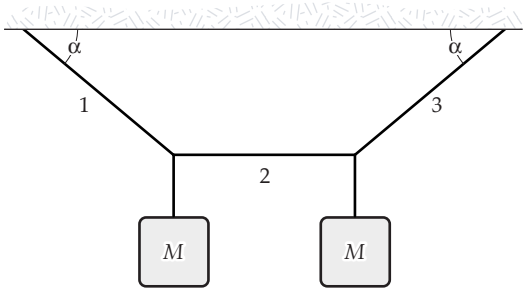
a. 36 lb
b. 33 lb
c. 41 lb
d. 39 lb
e. 56 lb

6. If $\alpha = 40°$, $\beta = 60°$, and $M = 4.0$ kg, determine the tension in string 1.



a. 15 N
b. 22 N
c. 17 N
d. 20 N
e. 36 N

7. If $\alpha = 40°$ and the tension in string 2 is 30 N, determine M.

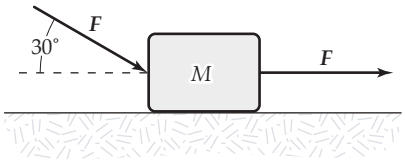


a. 3.4 kg
b. 3.6 kg
c. 2.6 kg
d. 4.9 kg
e. 7.5 kg

8. Two forces are the only forces acting on a 3.0-kg object which moves with an acceleration of 3.0 m/s^2 in the positive y direction. If one of the forces acts in the positive x direction and has a magnitude of 8.0 N, what is the magnitude of the other force?

a. 12 N
b. 14 N
c. 16 N
d. 18 N
e. 22 N

9. The horizontal surface on which the block slides is frictionless. If $F = 20$ N and $M = 5.0$ kg, what is the magnitude of the resulting acceleration of the block?



a. 5.3 m/s^2
b. 6.2 m/s^2
c. 7.5 m/s^2
d. 4.7 m/s^2
e. 3.2 m/s^2

10. The only two forces acting on a body have magnitudes of 20 N and 35 N and directions that differ by 80°. The resulting acceleration has a magnitude of 20 m/s^2. What is the mass of the body?

a. 2.4 kg
b. 2.2 kg
c. 2.7 kg
d. 3.1 kg
e. 1.5 kg

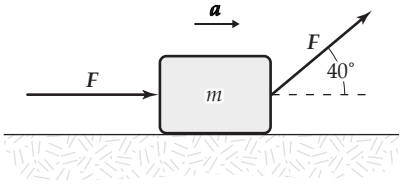
11. If the only forces acting on a 2.0-kg mass are $\mathbf{F}_1 = (3\mathbf{i} - 8\mathbf{j})$ N and $\mathbf{F}_2 = (5\mathbf{i} + 3\mathbf{j})$ N, what is the magnitude of the acceleration of the particle?

a. 1.5 m/s^2
b. 6.5 m/s^2
c. 4.7 m/s^2
d. 9.4 m/s^2
e. 7.2 m/s^2

12. At an instant when a 4.0-kg object has an acceleration equal to $(5\mathbf{i} + 3\mathbf{j})$ m/s^2, one of the two forces acting on the object is known to be $(12\mathbf{i} + 22\mathbf{j})$ N. Determine the magnitude of the other force acting on the object.

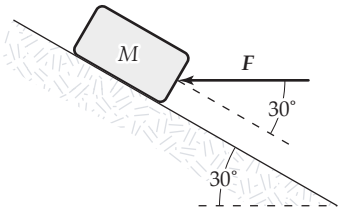
a. 2.0 N
b. 13 N
c. 18 N
d. 1.7 N
e. 20 N

13. If $F = 4.0$ N and $m = 2.0$ kg, what is the magnitude a of the acceleration for the block shown below? The surface is frictionless.



a. 5.3 m/s^2
b. 4.4 m/s^2
c. 3.5 m/s^2
d. 6.2 m/s^2
e. 8.4 m/s^2

14. A block is pushed up a frictionless 30° incline by an applied force as shown. If $F = 25$ N and $M = 3.0$ kg, what is the magnitude of the resulting acceleration of the block?



a. 2.3 m/s^2
b. 4.6 m/s^2
c. 3.5 m/s^2
d. 2.9 m/s^2
e. 5.1 m/s^2

15. A 5.0-kg object is suspended by a string from the ceiling of an elevator that is accelerating downward at a rate of 2.6 m/s^2. What is the tension in the string?

a. 49 N
b. 36 N
c. 62 N
d. 13 N
e. 52 N

16. The tension in a string from which a 4.0-kg object is suspended in an elevator is equal to 44 N. What is the acceleration of the elevator?

a. 11 m/s^2 upward
b. 1.2 m/s^2 upward
c. 1.2 m/s^2 downward
d. 10 m/s^2 upward
e. 2.4 m/s^2 downward

17. A 5.0-kg mass is attached to the ceiling of an elevator by a rope whose mass is negligible. What force does the mass exert on the rope when the elevator has an acceleration of 4.0 m/s^2 upward?

a. 69 N downward
b. 29 N downward
c. 49 N downward
d. 20 N downward
e. 19 N downward

18. A 5.0-kg mass is suspended by a string from the ceiling of an elevator that is moving upward with a speed which is decreasing at a constant rate of 2.0 m/s in each second. What is the tension in the string supporting the mass?

a. 49 N
b. 39 N
c. 59 N
d. 10 N
e. 42 N

19. A person weighing 0.70 kN rides in an elevator that has an upward acceleration of 1.5 m/s^2. What is the magnitude of the force of the elevator floor on the person?

a. 0.11 kN
b. 0.81 kN
c. 0.70 kN
d. 0.59 kN
e. 0.64 kN

20. A 3.0-kg block slides on a frictionless 20° inclined plane. A force of 16 N acting parallel to the incline and up the incline is applied to the block. What is the acceleration of the block?

a. 2.0 m/s^2 down the incline
b. 5.3 m/s^2 up the incline
c. 2.0 m/s^2 up the incline
d. 3.9 m/s^2 down the incline
e. 3.9 m/s^2 up the incline

21. A 2.0-kg block slides on a frictionless 25° inclined plane. A force of 4.6 N acting parallel to the incline and up the incline is applied to the block. What is the acceleration of the block?

a. 1.8 m/s^2 up the incline
b. 2.3 m/s^2 up the incline
c. 6.6 m/s^2 down the incline
d. 1.8 m/s^2 down the incline
e. 2.3 m/s^2 down the incline

22. A 2.0-kg block slides on a frictionless 15° inclined plane. A force acting parallel to the incline is applied to the block. The acceleration of the block is 1.5 m/s^2 down the incline. What is the applied force?

a. 8.1 N down the incline
b. 3.0 N down the incline
c. 2.1 N up the incline
d. 3.0 N up the incline
e. 8.1 N up the incline

23. A 1.5-kg object has a velocity of 5**j** m/s at $t = 0$. It is accelerated at a constant rate for five seconds after which it has a velocity of (6**i** + 12**j**) m/s. What is the magnitude of the resultant force acting on the object during this time interval?

a. 3.8 N
b. 3.2 N
c. 2.8 N
d. 4.3 N
e. 4.6 N

24. A 1.5-kg object has a velocity of 5**j** m/s at $t = 0$. It is accelerated at a constant rate for five seconds after which it has a velocity of (6**i** + 12**j**) m/s. What is the direction of the resultant force acting on the object during this time interval?

a. 65°
b. 56°
c. 61°
d. 49°
e. 27°

25. A 2.0-kg object has a velocity of 4.0**i** m/s at $t = 0$. A constant resultant force of (2.0**i** + 4.0**j**) N then acts on the object for 3.0 s. What is the magnitude of the object's velocity at the end of the 3.0-s interval?

a. 9.2 m/s
b. 6.3 m/s
c. 8.2 m/s
d. 7.2 m/s
e. 7.7 m/s

26. A 1.5-kg mass has an acceleration of (4.0**i** – 3.0**j**) m/s^2. Only two forces act on the mass. If one of the forces is (2.0**i** – 1.4**j**) N, what is the magnitude of the other force?

a. 4.1 N
b. 6.1 N
c. 5.1 N
d. 7.1 N
e. 2.4 N