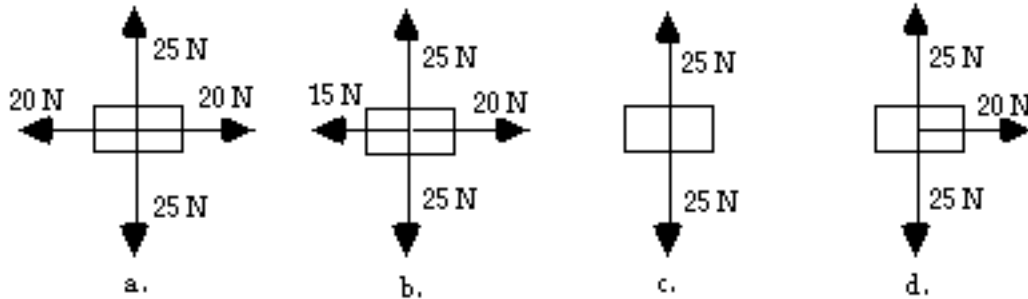


## NEWTON'S LAWS

1. Which one(s) of the following force diagrams depict an object moving to the right with a constant speed? List all that apply.



2. Taylor applies a 4.25-N rightward force to a 0.765-kg book to accelerate it across a table top. The coefficient of friction between the book and the tabletop is 0.410. Determine the acceleration of the book.

3. In a physics lab, Anjali and Hailey use a hanging mass and pulley system to exert a 2.45 N rightward force on a 0.500-kg cart to accelerate it across a low-friction track. If the total resistance force to the motion of the cart is 0.720 N, then what is the cart's acceleration?

4. A 72.0-kg skydiver is falling from 10 000.0 feet. After reaching terminal velocity, the skydiver opens his parachute. Shortly thereafter, there is an instant in time in which the skydiver encounters an air resistance force of 1180 Newtons. Determine the acceleration of the skydiver at this instant.

5. Free fall is motion in which gravity is the only force acting. (a) Is a skydiver who has reached terminal speed in free fall?

6. A 4.44-kg bucket suspended by a rope is accelerated upwards from an initial rest position. If the tension in the rope is a constant value of 83.1 Newtons, then determine the acceleration (in m/s/s) of the bucket.

7. A shopper in a supermarket pushes a loaded cart with a horizontal force of 16.5 Newtons. If the cart has a mass of 33.8 kg, how far (in meters) will it move in 1.31 seconds, starting from rest? (Neglect resistive forces.)

8. A tow truck exerts a 18300-N force upon a 1200.0-kg car to drag it out of a mud puddle onto the shoulder of a road. A 17900 N force opposes the car's motion. The plane of motion of the car is horizontal. Determine the time required to drag the car a distance of 6.90 meters from its rest position.

#### HOMEWORK KEY

1. A,C
2.  $1.54 \text{ m/s}^2$ , right
3.  $3.46 \text{ m/s}^2$ , right
4.  $6.59 \text{ m/s}^2$ , up
5. no key
6.  $8.92 \text{ m/s}^2$ , up
7. 0.419 m
8. 6.43 s