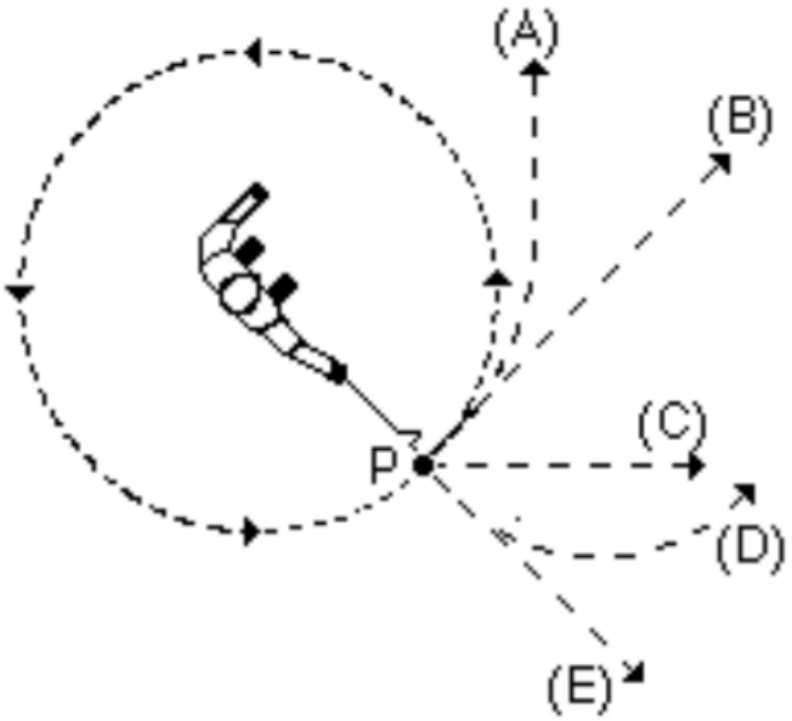
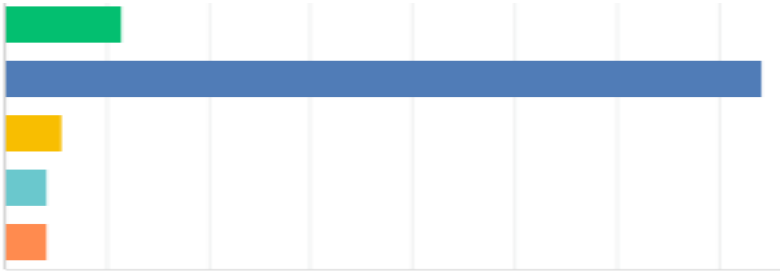
At the point P indicated in the figure, the string suddenly breaks near the ball.



2. If these events are observed from directly above as in the figure, which path would the ball most closely follow after the string breaks?

- A
- B
- C
- D
- E

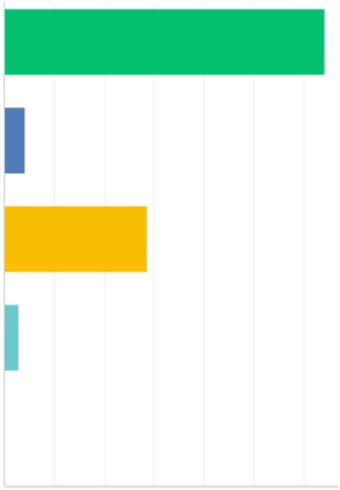


For the next problem, this is the standard Newton's third law… that a force is a ***single*** interaction between two bodies, acting on each equally in opposite directions. So the correct answer for both scenarios was equal and opposite, regardless of speed and mass… because there's only one force.

A large truck breaks down out on the road and receives a push back into town by a small compact car as shown in the figure below.

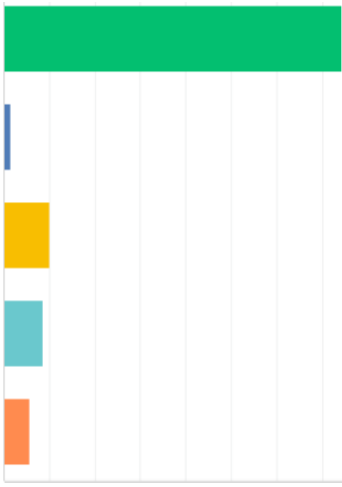
3. While the car, still pushing the truck, is speeding up to get up to cruising speed:

- the amount of force with which the car pushes on the truck is equal to that with which the truck pushes back on the car.
- the amount of force with which the car pushes on the truck is smaller than that with which the truck pushes back on the car.
- the amount of force with which the car pushes on the truck is greater than that with which the truck pushes back on the car.
- the car's engine is running so the car pushes against the truck, but the truck's engine is not running so the truck cannot push back against the car. The truck is pushed forward simply because it is in the way of the car.
- neither the car nor the truck exert any force on the other. The truck is pushed forward simply because it is in the way of the car.



4. After the car reaches the constant cruising speed at which its driver wishes to push the truck:

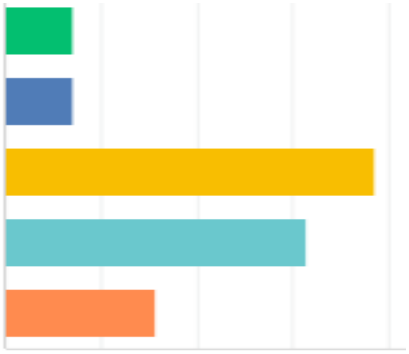
- the amount of force with which the car pushes on the truck is equal to that with which the truck pushes back on the car.
- the amount of force with which the car pushes on the truck is smaller than that with which the truck pushes back on the car.
- the amount of force with which the car pushes on the truck is greater than that with which the truck pushes back on the car.
- the car's engine is running so the car pushes against the truck, but the truck's engine is not running so the truck cannot push back against the car. The truck is pushed forward simply because it is in the way of the car.
- neither the car nor the truck exert any force on the other. The truck is pushed forward simply because it is in the way of the car.



We had the one below before as well. If speed is constant, there's no acceleration, the body is in equilibrium and the sum of the forces is zero. Then if she doubles the force, then there is a net force forward and the box will accelerate.

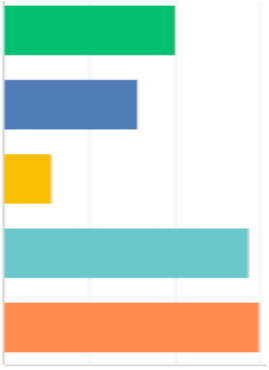
5. A woman exerts a constant horizontal force on a large box. As a result, the box moves across a horizontal floor at a constant speed "v_0".

The constant horizontal force applied by the woman:



- has the same magnitude as the weight of the box.
- is greater than the weight of the box.
- has the same magnitude as the total force which resists the motion of the box.
- is greater than the total force which resists the motion of the box.
- is greater than either the weight of the box or the total force which resists its motion.

6. If the woman in the previous question doubles the constant horizontal force that she exerts on the box to push it on the same horizontal floor, the box then moves:

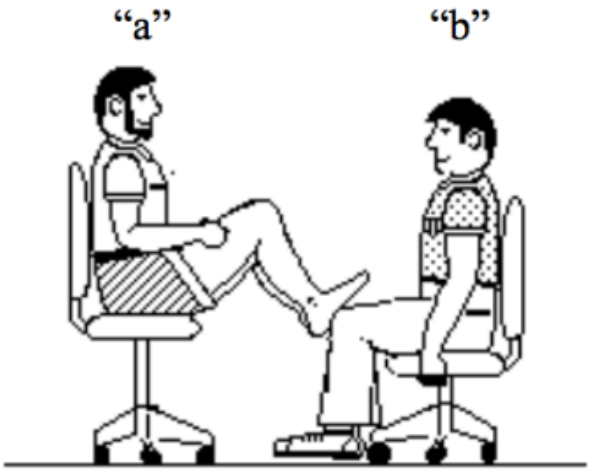


- with a constant speed that is double the speed "vo" in the previous question.
- with a constant speed that is greater than the speed "vo" in the previous question, but not necessarily twice as great.
- for a while with a speed that is constant and greater than the speed "vo" in the previous question, then with a speed that increases thereafter.
- for a while with an increasing speed, then with a constant speed thereafter.
- with a continuously increasing speed.

Again, for the next one, we've done this before. Please see the answer for 3, and 4, above.

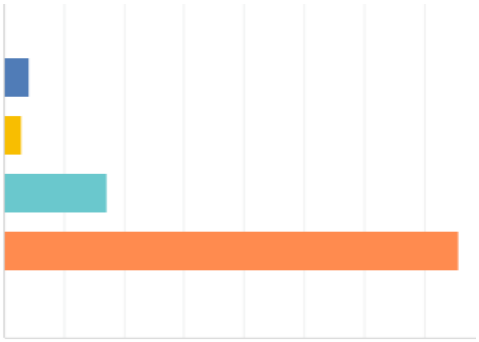
In the figure below, student "a" has a mass of 95 kg and student "b" has a mass of 77 kg. They sit in identical office chairs facing each other.

Student "a" places his bare feet on the knees of student "b", as shown. Student "a" then suddenly pushes outward with his feet, causing both chairs to move.



7. During the push and while the students are still touching each other:

- neither student exerts a force on the other.
- student "a" exerts a force on student "b", but "b" does not exert any force on "a".
- each student exerts a force on the other, but "b" exerts the larger force.
- each student exerts a force on the other, but "a" exerts the larger force.
- each student exerts the same amount of force on the other.
- none of these choices are correct



8. An empty office chair is at rest on a floor. Consider the following forces:

1. A downward force of gravity.
2. An upward force exerted by the floor.
3. A net downward force exerted by the air.
4. Which of the forces is (are) acting on the office chair?

- 1 only.
- 1 and 2.
- 2 an 3.
- 1, 2, and 3.
- none of the forces. (since the chair is at rest there are no forces acting upon it.)