

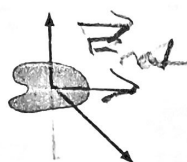
5

Force and Motion

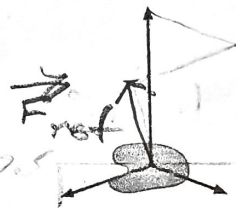
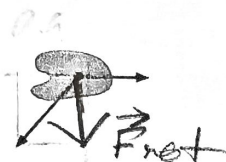
10-06-20
11A

5.1 Force

1. Two or more forces are shown on the objects below. Draw and label the net force \vec{F}_{net} .



2. Two or more forces are shown on the objects below. Draw and label the net force \vec{F}_{net} .

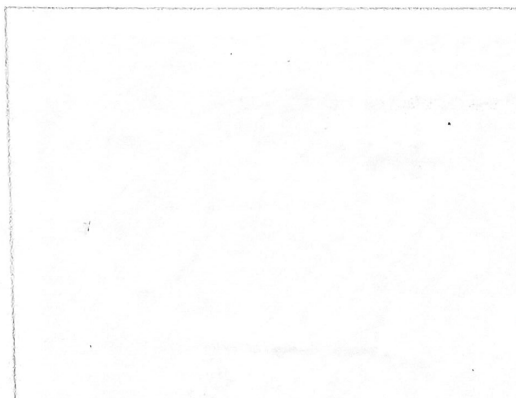


5.2 A Short Catalog of Forces

5.3 Identifying Forces

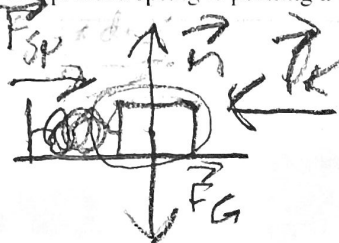
Exercises 3–8: Follow the six-step procedure of Tactics Box 5.2 to identify and name all the forces acting on the object.

3. An elevator suspended by a cable is descending at constant velocity.



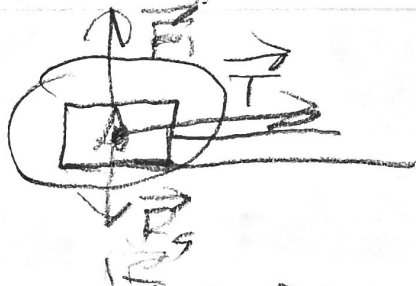
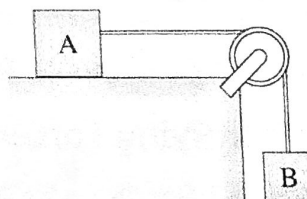
4. A car on a very slippery icy road is sliding headfirst into a snowbank, where it gently comes to rest with no one injured. (Question: What does "very slippery" imply?)

5. A compressed spring is pushing a block across a rough horizontal table.

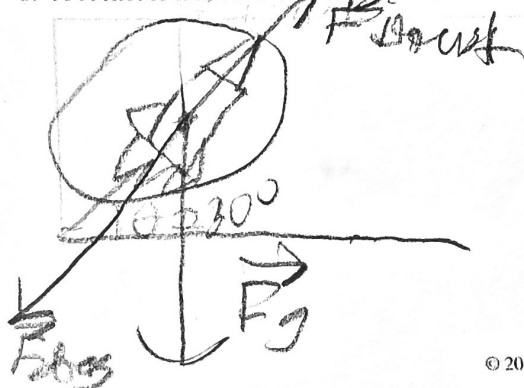


6. A brick is falling from the roof of a three-story building.

7. Blocks A and B are connected by a string passing over a pulley. Block B is falling and dragging block A across a frictionless table. Analyze block A.



8. A rocket is launched at a 30° angle. Air resistance is not negligible.

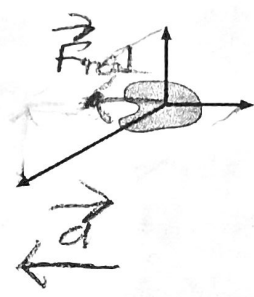
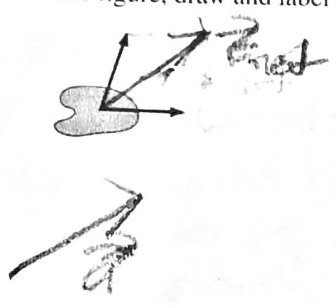


San Diego

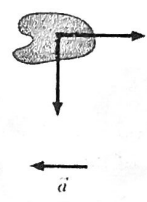
Brandon
10-06-20
Phys 111

14. Forces are shown on two objects. For each:

- Draw and label the net force vector. Do this right on the figure.
- Below the figure, draw and label the object's acceleration vector.



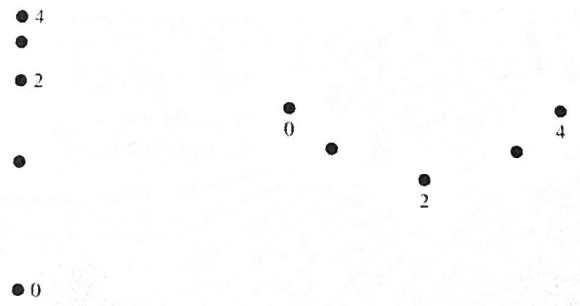
15. In the figures below, one force is missing. Use the given direction of acceleration to determine the missing force and draw it on the object. Do all work directly on the figure.



16. Below are two motion diagrams for a particle. Draw and label the net force vector at point 2.



17. Below are two motion diagrams for a particle. Draw and label the net force vector at point 2.



5.6 Newton's First Law

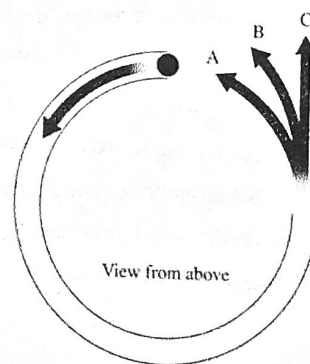
18. If an object is at rest, can you conclude that there are no forces acting on it? Explain.

If an object is at rest, you can't exactly conclude that no forces are acting on it. It would be more correct to say that the sum of the forces acting on it is zero. For instance, gravity affects every object, but it is offset by a normal force.

19. If a force is exerted on an object, is it possible for that object to be moving with constant velocity? Explain.

If a force is exerted on an object, it is not possible for that object to move with constant velocity. If an object is moving with constant velocity, but a force is applied on it, its velocity will be altered. This leads to a change in acceleration, which means it's not constant velocity. Only when no external forces are applied.

20. A hollow tube forms three-quarters of a circle. It is lying flat on a table. A ball is shot through the tube at high speed. As the ball emerges from the other end, does it follow path A, path B, or path C? Explain your reasoning.



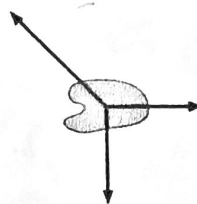
San Diego

Beaudin
10-06-20
Phs 11A

21. Which, if either, of the objects shown below is in equilibrium? Explain your reasoning.

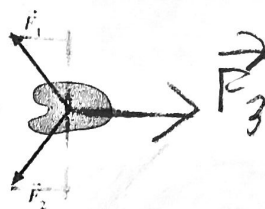


This object is not in equilibrium because the forces do not sum up to 0.



This object is in equilibrium because the forces cancel each other out and sum up to a net force of 0.

22. Two forces are shown on the objects below. Add a third force \vec{F}_3 that will cause the object to be in equilibrium.



23. Are the following inertial reference frames? Answer Yes or No.

- A car driving at steady speed on a straight and level road.
- A car driving at steady speed up a 10° incline.
- A car speeding up after leaving a stop sign.
- A car driving at steady speed around a curve.
- A hot air balloon rising straight up at steady speed.
- A skydiver just after leaping out of a plane.
- A space station orbiting the earth.
