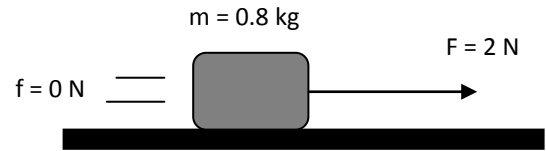


Forces Homework 4

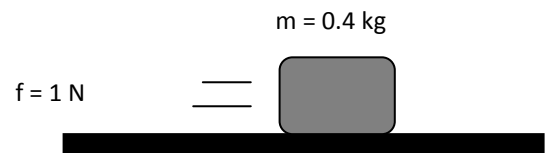
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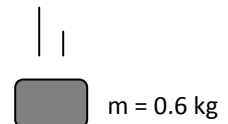
1. A 0.8 kg block is being pulled by a 2 N force across a smooth frictionless surface.
Draw a force diagram for the block.
Find the acceleration of the block.
How far will the block slide in 3 seconds?



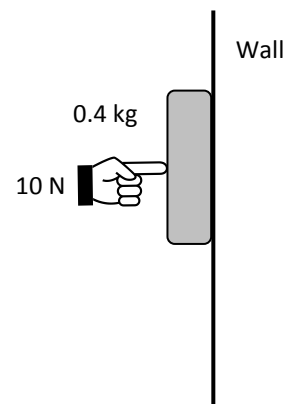
2. A 0.4 kg block is sliding across a rough surface and slowing. The frictional force between the block and the surface is 1 N.
Draw a force diagram for the block.
Find the acceleration of the block.
If the initial velocity of the block is 2 m/s, how far will the block slide before coming to a stop?



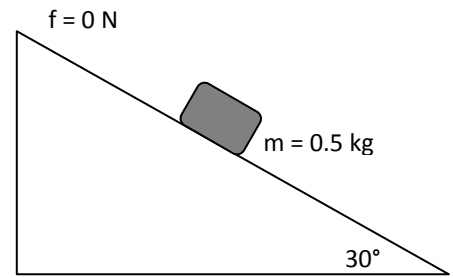
3. A 0.6 kg block is falling through the air as shown. The air (resistance) pushes up on the block with 2 N of force.
Draw a force diagram for the block.
Find the acceleration of the block.
What would be the change in velocity after 2 seconds?



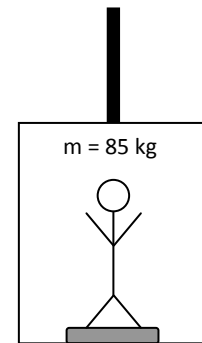
4. A hand pushes a 0.4 kg block against a wall with a 10 N force. The friction between the block and the wall is only 3.8 N.
Draw a force diagram for the block.
Find the acceleration of the block.



5. A 0.5 kg block is set on a 30° ramp and released from rest.
 Draw a force diagram for the block (draw it on the block).
 Find the acceleration of the block.
 If the ramp is 2 meters long, how long will it take to get from the top of the ramp to the bottom?

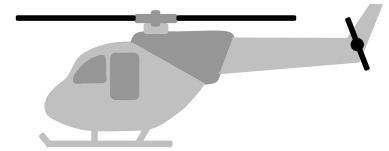


6. A man is standing in an elevator at rest on the 1st floor on a bathroom scale calibrated in Newtons. Before the elevator begins moving the scale reads 850 N. The elevator begins moving upward and the reading on the scale increases to 1020 N. The scale then returns to 850 N while the elevator is moving at a constant speed and then when the elevator comes to a stop the scale drops to 595 N.
 When does the man feel normal?
 What is his acceleration?
 Draw a force diagram for this moment.



7. When does the man feel heavy?
 What is his acceleration?
 Draw a force diagram for this moment.
8. When does the man feel light?
 What is his acceleration?
 Draw a force diagram for this moment.
9. All of the sudden, the elevator cable breaks!
 What is the acceleration of the man?
 What is the weight of the man?
 What does the scale read?
 How does he feel?
 Draw a force diagram for this moment.

10. The blades of a 4600 kg helicopter spin at approximately 2000 rpm (rotations per minute) to keep the helicopter aloft.
What are the Newton's 3rd law force pairs responsible for the upward force on the helicopter?



11. If the helicopter is hovering what is the force of the air on the blades?
Draw a force diagram for this moment.
12. If the helicopter is accelerating upward at 2.0 m/s^2 what is the force of the air blades?
Draw a force diagram for this moment.
How would the pilot feel while accelerating?
13. If the helicopter is moving downward at a constant 10 m/s what is the force of the air blades?
How would the pilot feel?
Draw a force diagram for this moment.

14. A 50 kg skydiver steps out of a helicopter.
What is her acceleration at the instant she steps out?
Draw a force diagram for this moment.

15. Moments later her acceleration is 5 m/s/s. What is the force of the air on her?
Draw a force diagram for this moment.

16. Soon after she is falling at a constant speed. Compare the forces on the diver.
Draw a force diagram for this moment.

17. When she pulls the ripcord she slows down from 60 m/s to 10 m/s in 1 second.
What is her acceleration?
How many "g"s does she feel?
What is the force of the air on her parachute?
Draw a force diagram for this moment.

18. When does the skydiver go upward?