

Conceptual Physics – Newton's Laws Test Review

1. Friction is a force that always acts in what direction?
2. What does Newton's First Law (law of inertia) state?
3. What amount of force is needed to keep a cannonball fired into frictionless space moving?
4. What is the force required to keep an object moving at constant speed in free space?
5. What would happen to planets if the force of gravity suddenly stopped acting on them?
6. Two objects are moving at constant speed in a straight line. The first object has twice the mass and twice the _____ of the second object.
7. How much does a 10.0 kg textbook weigh?
8. A bag of tools has a mass of 25.0 kg and a weight of _____?
9. You and a friend are jumping on a trampoline. Why does Earth, which is rapidly orbiting around the sun, not move under your feet when you jump?
10. What do forces produce?
11. Consider the formula for force, how does acceleration of an object change in relation to its mass?
How does acceleration of an object change in relation to the net force applied on the object?
12. What is the acceleration of an object when it reaches terminal velocity?
13. A 5 kg rock and 1 kg book are dropped in a vacuum. Compared to the 1 kg book, how much gravitational force is acting on the 5 kg rock?
14. What is the net force on a book resting in your hands, if the book weighs 5 N?
15. A boy pulls on a 15 kg wagon with a constant force of 30 N. What is the wagon's acceleration?
16. Consider the force formula. An object has a constant mass. A constant force on the object produces constant _____?
17. A box is dragged without acceleration in a straight-line path across a level surface by a force of 9 N. What is the frictional force between the box and the surface?
18. Define pressure and identify its unit.
19. Why do a tennis ball and a solid steel ball accelerate at the same rate in the absence of air resistance? (Use the relationship between force, mass and acceleration to answer)
20. As a care package falls from a high-flying stationary helicopter, its velocity increases. What happens to its acceleration?
21. If you pull horizontally on a desk with a force of 100 N and the desk doesn't move, the friction force must be 100 N. Now if you pull with 230 N so the desk slides at constant velocity, what would be the frictional force?
22. If the force acting on a cart doubles, what happens to the cart's acceleration?
23. Suppose a cart is being moved by a force. If suddenly a load is dumped into the cart so that the cart's mass doubles, what happens to the cart's acceleration?
24. A 35 N falling object encounters 6 N of air resistance. What is the magnitude of the net force on the object?
25. What is the magnitude of the force acting on a sports car with a mass of 1800 kg that causes it to accelerate at 2 m/s^2 ?
26. A tow truck exerts a force of 1500 N on a car, accelerating it at 2 m/s^2 . What is the mass of the car?

27. An airliner has a mass of 50,500 kg. The thrust for each of its four engines is 15,000 N. What is the jet's acceleration when taking off?
28. You pull horizontally on a 26 kg crate with a force of 200 N and the friction force on the crate is 245 N. What is the acceleration of the crate?
29. How much force is needed to accelerate a 3.5 kg physics book to an acceleration of 5.0 m/s^2 ?
30. If shopping cart A has five times more mass in it than shopping cart B and the two carts are pushed with equal forces, you can expect the acceleration of shopping cart A to be how many times greater/lesser than shopping cart B?
31. Whenever an object exerts a force on another object, the second object exerts a force of the same magnitude, but in the opposite direction to that of the first object. Is this true or false?
32. Forces always occur in _____.
33. An unfortunate bug splatters against the windshield of a moving car. Compared to the force of the car on the bug, the force of the bug on the car is _____? Compared to the deceleration of the car, the deceleration of the bug is _____?
34. A rocket is able to accelerate in the vacuum of space when it fires its engines. The force that propels the rocket is the _____?
35. Two people pull on a rope in a tug-of-war. Each pulls with 300 N of force. What is the tension in the rope?
36. You drive past a farm, and you see a cow pulling a plow to till a field. You have just learned about Newton's third law, and you wonder how the cow is able to move forward if the plow is exerting an equal and opposite force on the cow. Explain the movement of the cow and the plow using Newton's 3rd Law.
37. If you exert a force of 10,000 N on a 2300 kg car and apply the same force to a 4000 kg truck that are both originally at rest, what will be the resulting accelerations of the objects?