

Worksheet on Newton's Laws



1. What name is given to the property of an object to resist changes in motion?
2. What is the tendency of an object at rest when no net forces act on it? An object in motion?
3. What produces acceleration?
4. If the net force acting on a sliding block is tripled, what happens to the acceleration?
5. If the mass of a sliding block is tripled, while the net force stays the same, what happens to the acceleration?
6. Suppose you exert a horizontal push of 50.0 N on a crate that rests on a level floor, and it doesn't move. How much friction acts on the crate? Draw a diagram.
7. How great is the air resistance that acts on a 12.0 N sack that falls at constant velocity?
8. State Newton's third law of motion.
9. Consider hitting a baseball with a bat. If the action force is the force the bat exerts on the ball, what is the reaction force?
10. If you hit a wall with a force of 250 N, how much force does the wall exert on you?
11. Newton's first law is often called the law of _____; Newton's second law highlights the concepts of force, mass and _____; and Newton's third law is the law of _____ and _____.
12. Andrew weighs 300.0 N and holds his 90.0 N dog in his arms. He also holds a helium balloon that pulls him upward with a force of 2.00 N. How much net force is acting on Andrew?
13. John pushes horizontally with an 80.0 N force against a heavy desk, but the desk doesn't move. How much friction force acts horizontally between the desk and the floor?
14. Now John increases his push to 110.0 N, and the desk still does not move. How much friction force acts horizontally between the desk and the floor?
15. An airplane with a weight of 11000 N cruises at 180 km/h in level flight 2300 m above the ground. How much lift is acting on the plane?
16. How much net force is produced by a 30.0 N force and a 20.0 N force under the following situations: (a) Both forces in same direction (b) the two act in opposite directions (c) the two forces at right angles to each other.
17. What is the net force on a 1000.0 N barrel falling in air with an air drag of 400.0 N?
18. When a 1000.0 N barrel is sinking through the water at a constant speed, what is the upward force of water on the barrel?
19. A jet cruises at an altitude of 10000 m at a constant velocity of 700 km/h. The jet engines provide 40000 N of thrust. How much air drag acts on the jet?
20. A 400.0 kg bear grasping a vertical tree slides down at a constant velocity. What is the friction force that acts on the bear?
21. Calculate the acceleration of a 40.0 kg crate when pulled with a force of 200.0 N.

22. Calculate the horizontal force needed to make a 1.0 kg hockey puck accelerate at 1200 m/s^2 .
23. A 500.0 kg car and a 1500.0 kg car accelerate at the same rate. How much greater is the force that acts on the 1500.0 kg car than on the 500.0 kg car?
24. A 50.0 kg crate slides across a factory floor. The friction on the crate is 200.0 N. What is the acceleration of the crate?
25. If a woman weighed 500.0 N on Earth, what would she weigh on Jupiter, where the acceleration due to gravity is 26.0 m/s^2 ?
26. Calculate the acceleration of a 350000 kg jumbo jet as it takes off when the thrust of each of its four engines is 30,000 N.
27. Calculate the horizontal force that must be applied to produce an acceleration of 18.0 m/s^2 on a 1.2 kg hockey puck.
28. Byron puts on a pair of skates and straps a rocket to his back. Byron and the rocket together have a mass of 150.0 kg. The thrusting force of the rocket is 555 N, and the friction force is 80.0 N. What is Byron's acceleration? Draw a free body diagram of all the forces on Byron.
29. What is the pressure on a table when a 15.0 N book with a 0.050 m^2 cover lies flat on it?
30. What force must you exert on a ball point pen in order to apply a pressure of $6.70 \times 10^4 \text{ N/m}^2$ on a piece of paper, if the ball of the pen has a surface area of $1.20 \times 10^{-6} \text{ m}^2$ touching the paper?