

Newton's Second Law Problems

- The acceleration of an object is inversely proportional to the net force acting on it
- Newton's second law states that the acceleration of an object is inversely proportional to its mass
- Waldenia is accelerating her little red wagon at 2 m/s/s when Carpuccio throws a sandbag into the wagon, effectively doubling its mass. If Waldenia continues to pull in the same way, the acceleration of the wagon will become _____ m/s/s.
a. 4 m/s/s b. 8 m/s/s c. 2 m/s/s d. 1 m/s/s e. 0.5 m/s/s
- Preet and Harleen are accelerating a wagon at 2 m/s/s. Each person is pulling with the same force in the same direction. If Preet falls into the wagon, effectively doubling its mass, and Marleen continues to pull in the same way, the acceleration of the wagon will be:
a. 4 m/s/s b. 8 m/s/s c. 2 m/s/s d. 1 m/s/s e. 0.5 m/s/s
- Accelerations are produced by:
a. Velocities b. Accelerations c. Forces d. Masses e. Pressures
- Suppose a rock is accelerating through space by a constant 10 Newton net force. Suddenly, the rock encounters a second force of 10 Newtons in a direction opposite to that of the first force. With two forces acting on it, the rock:
a. Gradually decelerates to a halt
b. Theoretically accelerates to a speed close to the speed of light
c. Continues at the velocity it had when it encountered the second force
d. It is brought to a rapid halt
e. None of the above
- Troy and Carlie are accelerating a wagon at 2 m/s/s. Each is pulling with the same force in the same direction. If Troy falls down and Carlie continues to pull in the same way, the acceleration of the wagon will be _____ m/s/s
a. 4 m/s/s b. 8 m/s/s c. 2 m/s/s d. 1 m/s/s e. 0.5 m/s/s
- A car has a mass of 1500 kg and accelerates at 8 m/s/s. the magnitude of the net force acting on the car is _____ Newtons.
- The net force needed to accelerate a 2 kg physics book with an acceleration of 3 m/s/s is _____ N.
- A tow truck exerts a force of 3000 N on a car, accelerating it at 2 m/s/s. the mass of the car (neglecting friction) is _____ kg.
- A girl pulls on a 30 kg wagon with a constant force of 210 N. Neglecting friction, the wagon's acceleration will be _____ m/s/s.
- A bag of groceries has a mass of 30 kilograms and a weight (on earth) of about:
a. 30 N b. 10 N c. 3 N d. 0 N e. 300 N
- A person whose mass is 90 kg would weigh about _____ Newtons on a planet where $g = 20 \text{ m/s/s}$
- Which of the following quantities could be a mass?
a. 2.0 kg b. 3.6 m/s/s c. 4.5 N d. All of the above e. None of the above

15. Compared to its weight on Earth, a 10 kg object on the Moon will weight
a. Less b. More c. The same amount
16. An object weighs 30 N on Earth. A second object weighs 30 N on the Moon. Which has the greater mass?
a. The one on Earth
b. Not enough information to say
c. The one on the Moon
d. They have the same mass
17. Which of the following quantities are, for our purposes, the same as inertia?
a. Mass b. Volume c. Weight d. Acceleration e. None of the above
18. An astronaut weighs the same on Earth as in space (T/F)
19. How much inertia would a 2 kg box of feathers have compared to a 1 kg lump of iron?
a. Twice as much
b. Four times as much
c. One half as much
d. One quarter as much
e. The same
20. Which of the following quantities could be the weight of an object?
a. 2.0 kg b. 4.5 N c. 3.6 m/s/s d. All of the above e. None of the above
21. The SI (metric) unit of mass is the Newton. (T/F)
22. Which of the following is a fundamental property of matter?
a. Mass b. Acceleration c. Weight d. None of the above e. All of the above
23. Compared to its mass on Earth, the mass of a 10 kg object on the Moon is
a. More b. The same c. Less
24. Which of the following is a force?
a. Acceleration
b. Weight
c. Mass
d. None of the above
e. All of the above
25. A dog with a mass of 60 kg weighs about:
a. 600 N
b. 6 N
c. 60 N
d. Not enough information to tell
26. A box with a mass of 23 kg weighs 115 Newtons. This box is on Earth. (T/F)
27. The mass of a dog that weighs 130 Newtons on Earth is about:
a. 130 kg b. 1300 kg c. 0 kg d. 1.3 kg e. 13 kg
28. The force due to gravity acting on an object is called its mass. (T/F)