

Newton's Laws 1D Test Review

$$g = -10 \text{ m/s/s}$$

1. A scatterplot graph with mass in kg on the x-axis and force gravity experienced by those masses on the y-axis on a specific planet. The points on the scatterplot graph produced a straight line with a positive slope. The slope of the graph is equal to the _____.
2. Which of the following are fictitious forces?
 - a. Natural Force
 - b. Normal Force
 - c. Neutral Force
 - d. Force Inertia
3. A 90 Newton horizontal force is needed to keep an object weighing 900 N moving at a constant velocity of 5 m/s across a horizontal surface. The magnitude of the frictional force acting on the object is _____. Draw a force diagram for the object.

4. A ninja kicks an apple falling through the air. Compared to the magnitude of the force of the ninja's foot on the apple, the magnitude of the apple on the ninja's foot is _____.
 - a. Larger
 - b. Smaller
 - c. The Same
5. In an automobile collision a 54 kilogram passenger moving at 55 m/s is brought to rest in a time interval of .2 seconds. What is the magnitude of the average force exerted on the passenger during this time? Draw a force diagram and show your work.

6. A book in dynamic equilibrium on an elevator floor is pressed upon by an external downward force (in addition to force gravity). Assume the book remains in dynamic equilibrium after being pressed by the external force. The force normal from the floor on the book will _____ after the external force is applied compared to when the external force was not applied.
 - a. Decrease
 - b. Increase
 - c. Remains the same

7. A 1500 kg car traveling 20 m/s hits a tree and is brought to rest in 2 seconds. What is the magnitude of the average force acting on the car to bring it to rest? Draw a force diagram and show your work.
8. A 90 kg skydiver is falling at a constant velocity near the surface of earth. The magnitude of the force air friction acting on the skydiver is approximately _____. $g = -10 \text{ m/s}^2$
9. When a 17 N horizontal push force is applied to a box on a horizontal tabletop, the box remains at rest. The magnitude of force static friction acting on the box is _____.
10. A box is pushed up a ramp. The force friction on the box is directed _____.
- Up the ramp
 - Down the ramp
 - Perpendicular to the ramp
 - Normal to the ramp
11. A girl throws a ball. Compared to the magnitude of the force exerted on the ball by the girl, the magnitude of the force exerted on the girl by the ball is _____.
- Zero
 - Smaller, but greater than zero
 - Larger
 - The Same
12. A 50 kg student jumps down from a chair onto the floor in the physics room. At the instant the student lands on the floor her speed goes from -4 m/s to 0 m/s in .6 seconds. What is the average net force on the student during the .6 seconds? Draw a force diagram and show your work
13. Two forces push horizontally and concurrently on opposite sides of an object. No other forces act on the object and the object does not accelerate. Which force was larger?
- The force acting left
 - The force acting right
 - Neither force was larger

14. True (A) of False (B)
Balanced forces produce a zero net force.
15. True (A) of False (B)
Balanced forces will produce a zero acceleration.
16. An Astronaut pushes on a Tesla Roadster while orbiting the earth above the atmosphere.
The Astronaut has less mass than the Tesla Roadster. Which of the following is true?
- The Tesla pushes on the Astronaut with more force than the Astronaut pushes on the Tesla
 - The Tesla pushes on the Astronaut with the same force the Astronaut pushes on the Tesla
 - The Tesla will accelerate with a greater magnitude than the Astronaut.
 - The Tesla will accelerate with the same magnitude as the Astronaut.
17. A 15 kg mass at rest experiences a net force of 20 N. What is the magnitude of its acceleration?
Draw a force diagram and show your work.
18. A 15 kg mass moving at 15 m/s experiences a net force of 20 N in the direction of its motion.
What is the magnitude of its acceleration? Draw a force diagram and show your work.
19. A 15 kg mass accelerates at 100 m/s/s. What is the magnitude of the net force on the mass?
Draw a force diagram and show your work.
20. A 33 kg mass is pushed along the ground at a constant velocity for 11 seconds. What is the net force acting on the mass? Draw a force diagram and show your work.

21. A 40 kg mass experiences a net force of 8 N in the direction of its motion for 200 seconds. What is its change in velocity? Draw a force diagram and show your work.
22. A 50 kg mass experiences a net force of 180 N. Its velocity increases by 20 m/s. For how long did the net force act on the mass? Draw a force diagram and show your work.
23. A 42 kg skydiver eventually reaches terminal velocity without releasing her parachute. What is the magnitude of force air resistance when the skydiver reaches this terminal velocity? Draw a force diagram and show your work.
24. A 42 kg skydiver is accelerated upward at 16 m/s/s just after releasing her parachute. Consider the parachute and the skydiver to be a single system. What is the magnitude of force air resistance on the skydiver at this instant in time? Draw a force diagram and show your work.

25. An elevator of mass 600 kg hangs from a cable. The force tension in the cable results in an acceleration of 2 m/s^2 upward. What is the magnitude of tension in the cable? Draw a force diagram and show your work.

26. A small elevator of mass 20 kg hangs from a cable. The force tension in the cable results in an acceleration of 5 m/s^2 upward. What is the magnitude of tension in the cable? Draw a force diagram and show your work.

27. An elevator of mass 600 kg hangs from a cable. The force tension in the cable results in an acceleration of 10 m/s^2 downward. What is the magnitude of tension in the cable? Draw a force diagram and show your work

28. An elevator of mass 600 kg hangs from a cable. The force tension in the cable results in an acceleration of 0 m/s^2 . What is the magnitude of tension in the cable?

29. True (A) or False (B)

Net force on an object is positive when the object travels at a constant velocity.

30. True (A) or False (B)

Net force on an object is negative when the object is at rest.