

Newton's Second Law 2 (ANSWER KEY)

Solve the following problems

1. What is the mass in kg of a 200-lb person?
90.9 kg
2. What horizontal force must be applied to a 15-kg body in order to give it an acceleration of 3.00 m/s^2 ?
45 N
3. A car weighs 15000-N and is traveling along a highway at 27 m/s. If the driver immediately applies his brakes and the car comes to rest in 85 m, what net force acts on the car during its acceleration?
-6564N
4. A rifle bullet of mass 12.0-g has a muzzle velocity of 750 m/s. What is the net force acting on the bullet when the rifle is fired, assuming the bullet is accelerated over the entire 1.00-m length of the gun barrel?
3375N
5. A 5.00-g bullet is fired at a velocity of 360 km/hr (*almost* 225 miles per hour!) into a block of wood and comes to rest in 6.00 cm. What is the net force stopping the bullet?
417N
6. A rope breaks when the tension exceeds 240 N. What is the maximum acceleration downward that a 170 kg load can have without breaking the rope?
Anything less than 8.3 m/s^2 breaks the rope.
Any pull greater than 1.4 m/s^2 breaks the rope
7. A stunt driver drives a new Lexus into a pile of sand. It hits the pile with a velocity of 20 m/s and comes to a stop in 0.5 second. If the car's weight is 12,000 N, find the net force on the car during this collision.
49,979N
8. Given two identical objects, the one with more force on it will have more **Acceleration**.
9. If you apply the same force to two objects, one much more massive than the other, the one with **less** mass will accelerate more.
10. Total force and acceleration of an object are always in **same** direction.
11. (Giancoli, p.103 #10) REVIEW: A stone hangs by a fine thread from the ceiling and a section of the same thread dangles from the bottom of the stone. If a person gives a sharp pull downward on the dangling thread, where is the thread likely to break: Below the stone or above the stone? What if the person gives a slow and steady pull? Explain your answer.

Below the stone because the stone has inertia!