

Force Problems I

1. A car of mass 1000 kg is accelerating with a constant rate of 1.5 m/s^2 . What is the net force acting on the car?
2. An airplane is accelerating down the runway. The mass of the airplane is 15,000 kg. If the engines are producing a net thrust of 45,000 N, what is the acceleration of the airplane?
3. There is a net force of 200 N acting on a girl on a skateboard. If her acceleration is 4 m/s^2 , what is her mass?
4. Tony is pulling Fred, who is sitting in a wagon. Tony is pulling with a force of 250 N. Fred and the wagon have a combined mass of 75 kg. If there is also a frictional force of magnitude 100 N acting on Fred, what is Fred's acceleration?
5. Sasha is pushing Kara with a force 350 N. Kara has a mass of 50 kg. If Kara is accelerating with a rate of 2 m/s^2 , what is the magnitude of the force of friction acting on Kara?
6. A car of mass 1500 kg is accelerating with a rate of 3 m/s^2 . If the magnitude of the force of friction is 6000 N, how much force must the engine be producing?
7. You are in your car, mass 1500 kg, traveling down the highway with a speed of 25 m/s. You see traffic ahead and apply the brakes. You slow down to 15 m/s in 4 seconds. What was the net force on the car?
8. A happy physics student wants to determine how much force she can produce. Starting from rest, she accelerates and covers 5 meters in only 1.5 seconds. If she has a mass of 55 kg, what was the net force on her?
9. A skateboarder, mass 75 kg, coasts from 15 m/s to 10 m/s over a distance of 25 meters. What was the magnitude of the force of friction acting on the skateboarder?

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| 1. 1500 N | 2. 3 m/s^2 | 3. 50 kg | 4. 2 m/s^2 | 5. 250 N | 6. 10,500 N |
| 7. -3750 N | 8. 244 N | 9. 188 N | | | |