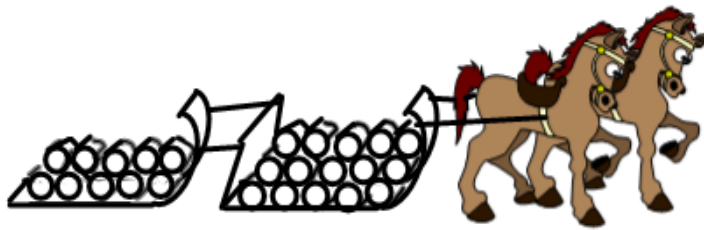


Newton's 3rd Law Practice Problems

1. Calvin and Steve are out for a day of mud-slinging fun in their trucks. Eventually Calvin's red 1400kg Jeep TJ breaks. Steve hooks a tow rope to him and pulls him out with his Silver Toyota Tacoma truck. The acceleration is 1.5m/s^2 . If the coefficient of friction from the mud is 0.85 determine:
 - a) The force of friction
 - b) The force on the hitch on the front of Calvin's jeep
 - c) The force on the hitch on the back of Steve's truck
 - d) Force of the ground to allow Steve to tow them both
2. You are running down the hallway in the Science wing and run straight into one of the grade 10 students in your advisory class. You go from a speed of 5.0m/s to a complete stop in 0.5seconds (ouch!). a) If your mass is 75kg, determine the force your classmate puts on you. b) How much force do you put on your classmate if their mass is i) 75kg ii) 100kg?
3. Marc is texting while driving his car when he runs into the back of a parked lunch truck (the kind that make hot lunches and parks near businesses). The lunch truck has a mass of 4200kg and as a result of the collision has a velocity of 5m/s within 1 sec. a) Determine the force that the car put on him. b) Determine the acceleration of the car if its mass is 1240kg. (Note: no one was seriously injured in the collision)
4. A pair of horses is hauling two sleighs full of logs that are connected. The first sleigh behind the horses has a mass of 2000kg, the second sleigh has a mass of 1000kg and the mass of each horse is 500kg. The force on the first hitch, hauling the first sleigh is 4440N. The coefficient of friction for the sleighs and the ground is 0.10.
 - a) Determine the acceleration of the sleighs and the horses. (0.5m/s^2)
 - b) Determine the force in the hitch that connects the sleighs. (1480N)



5. An 180 kg sled is moving at 10 m/s over smooth ice when it enters a rough stretch of ice 20 m long in which the force of friction is 360 N. a) What is the acceleration of the sled? b) With what speed does the sled emerge from the rough stretch? (-2.0m/s^2 , 4.47m/s)