These application questions will assess your understanding of Newton's Second Law and unbalanced forces. Make sure to completely answer each question and to show all of your work.

1. A Honda Civic accelerates at a rate of 4 m/s2. What would be the acceleration if it were towing an identical Honda Civic behind it so that the one engine had to pull twice the mass?
2. What net force would be necessary to cause a block of wood with a mass of 2.5 kg to accelerate at a rate of 3.0 m/s2?
3. A 1200 kg elephant steps off a cliff and falls with an acceleration of 9.8 m/s2. What is the magnitude of the net force acting on the elephant?
4. What is the rate of acceleration of a 25 kg child who is riding in a 5.0 kg wagon being pulled with a force of 75 N?
5. A force of 2200 N is accelerating an object with an acceleration of 11 m/s2. What is the mass of the object?
6. Calculate the force necessary to accelerate a 1000 kg car from 0 to 25 m/s in 5 seconds.
7. While driving my 1200 kg car at 30 m/s, I see a rabbit run out in the road in front of me. I slam on the brakes and skid to a stop in 5.0 seconds. With what force does friction slow down my car?
8. A 35 kg cheetah accelerates from rest to 25 m/s in 4.5 seconds. What is the average force that produces this acceleration?
9. A 4 kg block is sliding at a constant velocity of 1.5 m/s on a table, due to the pull of a hanging 0.5 kg mass as shown to the right. What is the constant force of friction acting between the block and the table?