1. A race car accelerates uniformly from 18.5 m/s to 46.1 m/s in 2.47 seconds. Determine (a) the acceleration of the car and (b) the distance traveled.
2. An airplane accelerates from rest down a runway at 3.20 m/s2 for 32.8 s until is finally lifts off the ground. Determine (a) the distance traveled before takeoff and (b) the velocity at takeoff.

1. A kangaroo is capable of jumping to a height of 2.62 m. After she leaves the ground, acceleration due to gravity acts upon her at a rate of 9.8m/s2 towards the ground. Determine the takeoff speed of the kangaroo.

1. A corvette can accelerate during high speeds at about 2.0 m/s2. At this rate how long does it take the car to accelerate from 80 km/h to 160 km/h?
2. A dragster accelerates from rest to a speed of 112 m/s over a distance of 398 m. Determine the acceleration (assume uniform) of the dragster.
3. A stone is dropped into a deep well and is heard to hit the water 3.41 s after being dropped. After it is released, acceleration due to gravity acts upon it at a rate of -9.8m/s2. Determine the depth of the well.

1. On a 150 m straight sprint, a cyclist accelerates from rest for 4.5 s at 3.8 m/s2. How long will it take her to complete the 150 m track, assuming she maintains her speed for the remaining part of the track?

1. It was once recorded that a Jaguar left skid marks that were 290 m in length. Assuming that the Jaguar skidded to a stop with a constant acceleration of -3.90 m/s2, determine the speed of the Jaguar before it began to skid.
2. In the 2008 Olympics, Jamaican sprinter Usain Bolt shocked the world as he ran the 100-meter dash in 9.69 seconds. Determine Usain's average speed for the race.

1. In the Funny Car competition at the Joliet Speedway in Joliet, Illinois in October of 2004, John Force complete the Â¼-mile dragster race in a record time of 4.437 seconds. Determine the average speed of the dragster in mi/hr and m/s. GIVEN: (1.000 mi =1609 m)
2. In the qualifying round of the 50-yd freestyle in the sectional swimming championship, Dugan got an early lead by finishing the first 25.00 yd in 10.01 seconds. Dugan finished the return leg (25.00 yd distance) in 10.22 seconds.
   1. Determine Dugan's average speed for the entire race.
   2. Determine Dugan's average speed for the first 25.00 yd leg of the race.
   3. Determine Dugan's average velocity for the entire race.
3. In last week's Homecoming victory, Al Konfurance, the star halfback of South's football team, broke a tackle at the line of scrimmage and darted upfield untouched. He averaged 9.8 m/s for an 80-yard (73 m) score. Determine the time for Al to run from the line of scrimmage to the end zone.
4. During the annual shuffleboard competition, Renee gives her puck an initial speed of 9.32 m/s. Once leaving her stick, the puck slows down at a rate of -4.06 m/s/s.
   1. Determine the time it takes the puck to slow to a stop.
   2. Use your initial speed and the calculated time to determine the average speed and the distance which the puck travels before stopping.
5. Ken Runfast is the star of the cross-country team. During a recent morning run, Ken averaged a speed of 5.8 m/s for 12.9 minutes. Ken then averaged a speed of 6.10 m/s for 7.1 minutes. Determine the total distance which Ken ran during his 20 minute jog.
6. The Lamborghini Murcielago can accelerate from 0 to 27.8 m/s (100 km/hr or 62.2 mi/hr) in a time of 3.40 seconds. Determine the acceleration of this car in both m/s/s and mi/hr/s.
7. Homer Agin leads the Varsity team in home runs. In a recent game, Homer hit a 96 mi/hr sinking curve ball head on, sending it off his bat in the exact opposite direction at 56 mi/hr. The actually contact between ball and bat lasted for 0.75 milliseconds. Determine the magnitude of the average acceleration of the ball during the contact with the bat. Express your answer in both mi/hr/s and in m/s/s. (Given: 1.00 m/s = 2.24 mi/hr)
8. A Formula One car is a single-seat racing car with an open cockpit and substantial wings located in the front and rear. At high speeds, the aerodynamics of the car help to create a strong downward force which allows the car to brake from 27.8 m/s (100 km/hr or 62.2 mi/hr) to 0 in as small of a distance as 17 meters. Determine the deceleration rate (i.e., acceleration) achieved by such a car.
9. A Cessna 150 airplane has a takeoff speed of 28 m/s (63 mi/hr). Determine the minimum length of the runway which would be required for the plane to take off if it averages an acceleration of 1.9 m/s/s.
10. Cynthia competes in luge competitions during the winter months. She rides solo on a small sled 3 inches off the ground down icy slopes, turning only by use of her feet and the shifting of her weight on the sled. During the initial stage of one downhill luge, Cynthia accelerated from rest at 6.84 m/s/s for 2.39 seconds. Determine the distance she moved during this acceleration phase.
11. Suzie Lavtaski has reached the end of the ski slope and abruptly decelerates from 29.0 m/s to 1.8 m/s in 1.45 seconds. Determine Suzie' acceleration rate and the distance she moved during this braking period