

## Acceleration Problem Set (A deeper look...)

1. A car is parked on a hill and starts to roll with an initial velocity of 2 m/s and accelerates at 3 m/s until it reaches a final speed of 30 m/s. How long does it take for this to happen?
2. Madison accelerates her mint red Ferrari 308 at 15 m/s/s for a period of 8 seconds, what is its final speed if it started from rest?
3. What is the acceleration of a Thrust SSC over a 15 second period if it goes from 200 m/s to 100 m/s?
4. A peregrine falcon is in a dive, chasing its prey. The falcon had accelerated at 9.8 m/s/s due to gravity. If it started its hunt at 20 m/s, how fast was it going at the time of impact with its prey, 13 seconds later?
5. A bowler throws a ball down a lane at 2.3 m/s of initial velocity. If it travels for 2.6 seconds with an average acceleration of  $-0.9$  m/s/s, what speed is it traveling when it strikes the pins?
6. Dimitri is a test pilot for Rolls Royce's jet engine division. He is testing a new prototype and in the Nevada desert, if he accelerates to 150 m/s from a standstill in 6 seconds, what was his acceleration for that period of time.
7. Meredyth hits a Wiffle ball in a heated game with an initial speed of 3.5 m/s. The ball remains in the air for 2.1 seconds before Alyssa R. catches it. If the Wiffle ball accelerated at  $-1.1$  m/s/s, what was the final speed just before Alyssa made the catch?
8. A car advertisement states that a certain car that Jessica loves can accelerate from rest to 70 km/h in 7 seconds. Find the car's average acceleration (pay attention to the units...).
9. A person timing player quickness watches Christian S. on the basketball court. Christian dribbles the ball from one end of the court to the other with an initial speed of 0 m/s and final speed of 14 m/s, he accelerates at a rate of 2 m/s/s. How long does it take Christian to get from one end of the court to the other?
10. Mr. F holds a water balloon over the entrance to Miley Cyrus' apartment building from a window 15 stories up. It takes Miley 8 seconds to get from her car to the door of the building. When Mr. F sees Miley get out of her car and walk toward the door, he drops the water balloon. Mr. F drops the water balloon from rest with an acceleration of 9.8 m/s/s. If the balloon is traveling 68.6 m/s before it would hit her, did he release the balloon in enough time to drench her?