ACCELERATION PRACTICE PROBLEMS

$$Acceleration = \frac{FinalVelocity - InitialVelocity}{Time}$$

YOU MUST SHOW YOUR WORK.
You can use a calculator but you must show all of the steps involved in doing the problem.

SHORT ANSWER

1. Does the speedometer of a car read average speed or instantaneous speed? How do you know?

2. If the speedometer of your car reads a constant speed of 40km/hr, can you say 100% for sure that the car has a constant velocity? Explain your answer.

3. What two controls on a car cause a change in speed?

4. What control causes a change in velocity?

5. What is the acceleration of a car that travels in a straight line at a constant speed?

6. Describe a situation in which you can accelerate even though your speed doesn't change.

CALCULATIONS

7. A roller coaster car rapidly picks up speed as it rolls down a slope. As it starts down the slope, its speed is 4 m/s. But 3 seconds later, at the bottom of the slope, its speed is 22 m/s. What is its average acceleration?

8. A cyclist accelerates from 0 m/s to 8 m/s in 3 seconds. What is his acceleration ? Is this acceleration higher than that of a car which accelerates from 0 to 30 m/s in 8 seconds?

9. A car advertisement states that a certain car can accelerate from rest to 70 km/h in 7 seconds. Find the car's average acceleration.

10. A lizard accelerates from 2 m/s to 10 m/s in 4 seconds. What is the lizard's average acceleration?

11. A runner covers the last straight stretch of a race in 4 s. During that time, he speeds up from 5 m/s to 9 m/s. What is the runner's acceleration in this part of the race?

12. You are traveling in a car that is moving at a velocity of 20 m/s. Suddenly, a car 10 meters in front of you slams on it's brakes. At that moment, you also slam on your brakes and slow to 5 m/s. Calculate the acceleration if it took 2 seconds to slow your car down.

13. A ball is dropped from the top of a building. After 2 seconds, it's velocity is measured to be 19.6 m/s. Calculate the acceleration for the dropped ball.

CHALLENGE QUESTIONS

14. If a Ferrari, with an initial velocity of 10 m/s, accelerates at a rate of 50 m/s/s for 3 seconds, what will its final velocity be?

15. Falling objects drop with an average acceleration of 9.8 m/s^2. If an object falls from a tall building, how long will it take before it reaches a speed of 49 m/s?

16. Josh rolled a bowling ball down a lane in 2.5 s. The ball traveled at a constant acceleration of 1.8 m/s2 down the lane and was traveling at a speed of 7.6 m/s by the time it reached the pins at the end of the lane. How fast was the ball going when it left Tim's hand?