

## Acceleration Formula Practice

1. In words, what is the definition of acceleration? How do the units reflect this definition?
2. A car goes from 30 km/h [E] to 50 km/h [E]. What is the direction of the acceleration?
3. A truck goes from 90 km/h [E] to 45 km/h [E]. What is the direction of the acceleration?
4. Give two examples where an object has a non-zero acceleration but an instantaneous velocity of zero.
5. How does uniform acceleration differ from uniform motion?
6. Describe a situation where an object can have a constant speed and experience a non-zero acceleration?
7. A roller coaster car rapidly picks up velocity as it rolls down a slope. As it starts down the slope, its velocity is 4 m/s. But 3 seconds later, at the bottom of the slope, its velocity is 22 m/s. What is its average acceleration? ( $6.0 \text{ m/s}^2$ )
8. A car accelerates at a rate of  $3.0 \text{ m/s}^2$ . If its original velocity is 8.0 m/s, how many seconds will it take the car to reach a final velocity of 25.0 m/s? (5.7 s)
9. 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? ( $2.7 \text{ m/s}^2$ ; No  $3.75 \text{ m/s}^2$ )
10. The final velocity of a car is 30m/s. The car is accelerating at a rate of  $2.5\text{m/s}^2$  over an 8 second period of time. What was the initial velocity of the car? (10 m/s)
11. If a Ferrari, with an initial velocity of 10 m/s, accelerates at a rate of  $50 \text{ m/s}^2$  for 3 seconds, what will its final velocity be? (160 m/s)
12. A car traveling at a velocity of 30.0 m/s encounters an emergency and comes to a complete stop. How much time will it take for the car to stop if its rate of deceleration is  $-4.0 \text{ m/s}^2$ ? (7.5 s)
13. A cart rolling down an incline for 5.0 seconds has an acceleration of  $4.0 \text{ m/s}^2$ . If the cart has a beginning velocity of 2.0 m/s, what is its final velocity? (22 m/s)
14. A parachute on a racing dragster opens and changes the velocity of the car from 85 m/s to 45 m/s in a period of 4.5 seconds. What is the acceleration of the dragster? ( $-8.9 \text{ m/s}^2$ )
15. A motorcycle traveling at 25 m/s accelerates at a rate of  $7.0 \text{ m/s}^2$  for 6.0 seconds. What is the final velocity of the motorcycle? (67 m/s)
16. A skier accelerates at a rate of  $4.6\text{m/s}^2$  for 4.5s. What is his initial velocity if his final velocity is 21m/s? (0.3 m/s)