

Science 10  
Extra Practice Acceleration Assignment

$$a = \frac{v_f - v_i}{t}$$

$$t = \frac{v_f - v_i}{a}$$

$$v_f = v_i + at$$

$$v_i = v_f - at$$

1. 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?
2. A car accelerates at a rate of 3.0 m/s<sup>2</sup>. If its initial speed is 8.0 m/s, how many seconds will it take the car to reach a final speed of 25.0 m/s?
3. 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 100km/h in 10 seconds?
4. The final speed of a car is 108km/h. The car is accelerating at a rate of 2.5km/h/s over an 8 second period of time. What is the initial speed of the car?
5. If a Ferrari, with an initial speed of 10 m/s, accelerates at a rate of 50 m/s<sup>2</sup> for 3 seconds, what will its final velocity be?
6. A car traveling at a speed 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 m/s<sup>2</sup>?
7. A cart rolling down an incline for 5.0 seconds has an acceleration of 4.0 m/s<sup>2</sup>. If the cart has an initial speed of 2.0 m/s, what is its final speed?
8. A parachute on a racing dragster opens and changes the speed of the car from 190 km/h to 20km/h in a period of 4.5 seconds. What is the acceleration of the dragster?
9. A motorcycle traveling at 25 m/s accelerates at a rate of 7.0 m/s<sup>2</sup> for 6.0 seconds. What is the final speed of the motorcycle?
10. A skier accelerates at a rate of 4.6m/s<sup>2</sup> for 4.5s. What is his initial speed if his final speed is 21m/s?
11. A hockey puck sliding on a frozen lake comes to rest after traveling 175s. If its initial velocity is 1.0m/s, what is its acceleration?
12. Batman's bat mobile is travelling at a speed of 80m/s and is decelerating at a rate of -11m/s<sup>2</sup> when it comes to a screeching halt because of a moose crossing the road. How long does it take the bat mobile to stop?
13. At the end of Bill's run he is travelling a speed of 18.5km/h. What is his initial speed if his acceleration is 0.25km/h<sup>2</sup> and he accelerates for 2hours?
14. A snowmobile reaches a final speed of 22.5m/s after accelerating at 1.2m/s<sup>2</sup> for 17s. What was the initial speed of the snowmobile?
15. A cyclist accelerates at a rate of 5.5 m/s<sup>2</sup>. How long will it take the cyclist to reach a speed of 18.3 m/s if he is starting from rest?