Sample Problem #1:

What is the average acceleration of a train which changes its velocity from 95 km/h north to 22 km/h north in a time of 15 minutes?   *Ans: 2.9×10^2 km/h^2 [S]*

Sample Problem #2:

A student is cycling to school at a constant velocity of 4.7 m/s [West] when she realizes she is late. Find her final velocity if she accelerates at a rate of 0.12 m/s^2 [West] for 15 seconds.   *Ans: 6.5 m/s [West]*

Homework Problems

1. A cyclist, travelling initially at 14 m/s [S] brakes smoothly and stops in 14.0 seconds. What is the cyclist's average acceleration?

2. In the second stage of a rocket launch, a rocket's upward velocity increased from 1.00×10^3 m/s [up] to 1.00×10^4 m/s [up] with an average acceleration of 31.0 m/s^2 [up]. How long did the acceleration last?

3. When a ball is thrown upward, it experiences a downward acceleration of magnitude 9.81 m/s^2 (neglecting air resistance). With what initial velocity must a ball leave a thrower's hand in order to climb for 2.20 seconds before it reaches its peak?

4. One of the world's fastest roller coasters has a velocity of 7.2 km/h [fwd] as it starts its descent on the first hill. Determine the coaster's maximum velocity at the base of the hill, assuming that the average acceleration of 35.0 km/h/s [fwd] lasts for 4.30 seconds.

5. Determine the final velocity of a car if it is initially travelling at 65.0 km/h [West] and it accelerates at 0.750 m/s^2 [East] for 10.0 seconds when it approaches a construction zone. Express your final answer in km/h.

Under what condition can an object have an eastward velocity and a westward acceleration at the same instant?

Answers: 1 1.0 m/s^2 [N]   2. 2.9×10^2 s   3. 21.6 m/s [up]   4. 158 km/h [fwd]   5. 38.0 km/h [West]