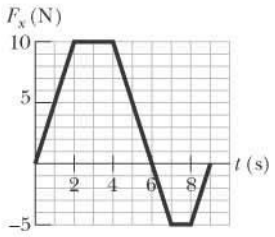
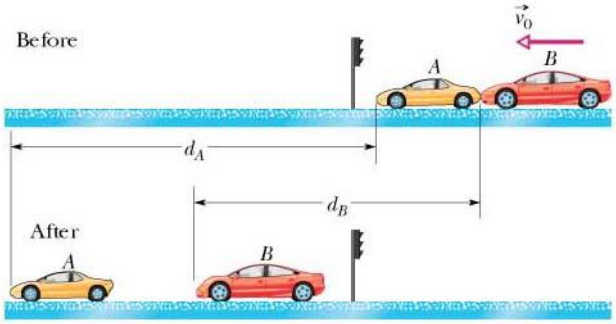
HOMEWORK - CHAPTER 9

••28 A 5.0 kg toy car can move along an *x* axis; the graph to the right gives F_x of the force acting on the car, which begins at rest at time $t = 0$. In unit-vector notation, what is $\vec{p}$ at (a) $t = 4.0\,s$ and (b) $t = 7.0\,s$, and (c) what is $\vec{v}$ at $t = 9.0\,s$?



•**36** A mechanical toy slides along an *x* axis on a frictionless surface with a velocity of $(-0.40\ m/s)\,\hat{i}$ when two internal springs separate the toy into three parts, as given in the table to the right. What is the velocity of part *A*?

Part	Mass (kg)	Velocity (m/s)
A	0.50	?
B	0.60	$0.20\,\hat{i}$
C	0.20	$0.30\,\hat{i}$



••48 In the "before" part of the figure to the right, car *A* (mass 1100 kg) is stopped at a traffic light when it is rear-ended by car *B* (mass 1400 kg). Both cars then slide with locked wheels until the frictional force from the slick road (with a low μ_k of 0.13) stops them, at distances $d_A = 8.2\ m$ and $d_B = 6.1\ m$. What are the speeds of (a) car *A* and (b) car *B* at the start of the sliding, just after the collision? (c) Assuming that linear momentum is conserved during the collision, find the speed of car *B* just before the collision. (d) Explain why this assumption may be invalid.

••60 A steel ball of mass 0.500 kg is fastened to a cord that is 70.0 cm long and fixed at the far end. The ball is then released when the cord is horizontal (as shown to the right). At the bottom of its path, the ball strikes a 2.50 kg steel block initially at rest on a frictionless surface. The collision is elastic. Find (a) the speed of the ball and (b) the speed of the block, both just after the collision.