

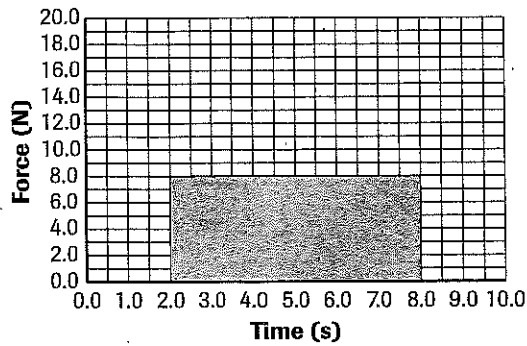
# 9 Study Guide

## Section 9.1

## Impulse and Momentum

In your textbook, read about relating impulse and momentum on pages 230–231.

The diagram shows the force-time graph for a force acting on a 12.0-kg cart initially at rest on a frictionless surface. Use the diagram to answer questions 1–8. Show your calculations where necessary.



1. What is the magnitude of the force acting on the cart? \_\_\_\_\_
2. How long does the force act on the cart? \_\_\_\_\_
3. The shaded area of the graph represents \_\_\_\_\_.
4. The algebraic expression that represents the shaded area of the graph is  
\_\_\_\_\_.
5. What is the amount of impulse acting on the cart? \_\_\_\_\_
6. The algebraic expression that represents the momentum of the cart is  
\_\_\_\_\_.
7. What is the change in momentum of the cart?
8. The final velocity of the cart is \_\_\_\_\_.

In your textbook, read about using the impulse-momentum theorem on page 231.

*Read each statement below. For each situation, calculate  $v_i$ ,  $v_f$ ,  $p_i$ ,  $p_f$ , the impulse vector  $F\Delta t$ , and the amount of force needed for the change to occur. All situations refer to a truck with a mass of 2840 kg.*

9. The truck has a velocity of 8.30 m/s and comes to a stop in 15.0 s.
  
  
  
  
  
  
  
  
  
  
10. The truck, initially at rest, reaches a velocity of 8.30 m/s in 20.0 s.
  
  
  
  
  
  
  
  
  
  
11. The truck is at rest. In 5.00 s, the truck backs up to a speed of 1.38 m/s.
  
  
  
  
  
  
  
  
  
  
12. The truck is moving backward with a velocity of 1.38 m/s and comes to a stop in 5.00 s.

In your textbook, read about the impulse-momentum theorem as it applies to air bags on page 231.

*Answer the following questions. Use complete sentences.*

13. List two ways in which impulse can be increased.

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14. How does an air bag reduce injuries that would be caused by the steering wheel during an accident? Write your answer in terms of impulse.

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