**1.**

**question**

(a)

What is the momentum in kg · m/s of a garbage truck that is 1.30 **✕** 104 kg and is moving at 35.0 m/s? (Enter a number.)  
  kg · m/s

(b)

At what speed in m/s would an 8.00 kg trash can have the same momentum as the truck? (Enter a number.)  
  m/s

**2.**

**question**

A 0.700 kg hammer is moving horizontally at 5.00 m/s when it strikes a nail and comes to rest after driving it 1.00 cm into a board.

(a)

Calculate the duration of the impact in seconds. (Enter a number.)  
  s

(b)

What was the average force in newtons exerted downward on the nail? (Enter a number.)  
  N

**3.**

**question**

Train cars are coupled together by being bumped into one another. Suppose two loaded train cars are moving toward one another, the first having a mass of 160,000 kg and a velocity of 0.300 m/s, and the second having a mass of 125,000 kg and a velocity of −0.120 m/s. (The minus indicates direction of motion.)

What is their final velocity (in m/s)? (Enter a number.)  
  m/s

**4.**

**[2/2 Points]**DETAILSPREVIOUS ANSWERS**OSCOLPHYS2016ACC 8.5.P.032.**

MY NOTES

ASK YOUR TEACHER

PRACTICE ANOTHER

**question**

During an ice show a 45.0 kg skater leaps into the air and is caught by an initially stationary 60.0 kg skater.

(a)

What is their final velocity in meters per second assuming negligible friction and that the 45.0 kg skater's original horizontal velocity was 4.00 m/s? (Enter a number.)  
  m/s

(b)

How much kinetic energy is lost in joules? (Enter a number.)  
  J

**5.**

**[2/3 Points]**DETAILSPREVIOUS ANSWERS**OSCOLPHYS2016ACC 8.1.WA.002.**

MY NOTES

ASK YOUR TEACHER

PRACTICE ANOTHER

**question**

Two carts mounted on an air track are moving toward one another. Cart 1 has a speed of 0.8 m/s and a mass of 0.39 kg. Cart 2 has a mass of 0.61 kg.  
  
(a) If the total momentum of the system is to be zero, what is the initial speed (in m/s) of Cart 2? (Enter a number.)  
  m/s  
  
(b) Does it follow that the kinetic energy of the system is also zero since the momentum of the system is zero?

Yes

No

(c) Determine the system's kinetic energy (in J) in order to substantiate your answer to part (b). (Enter a number.)  
-.2   
Can you write an expression for the total kinetic energy of the system (both carts)? J

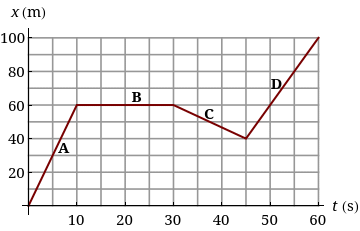
**6.**

**[2.7/3 Points]**DETAILSPREVIOUS ANSWERS**OSCOLPHYS2016 2.8.WA.043.**

MY NOTES

ASK YOUR TEACHER

An athlete is training on a 100 m long linear track. His motion is described by the graph of his position vs. time, below.



(a) For each segment of the graph, find the magnitude and direction of the athlete's velocity.

|  |  |
| --- | --- |
| magnitude *v*A | m/s |
| direction *v*A |  |
| magnitude *v*B | m/s |
| direction *v*B |  |
| magnitude *v*C | 25  Remember that velocity is the change in position per the change in time. If the graph plots position vs. time, what property of the plot in each segment is related to velocity? Think about the initial and final times and positions for each segment. m/s |
| direction *v*C |  |
| magnitude *v*D | m/s |
| direction *v*D |  |

(b) What are the magnitude and direction of the athlete's average velocity over the entire 60 s interval?

|  |  |
| --- | --- |
| magnitude | m/s |
| direction |  |

**7.**

**[2/2 Points]**DETAILSPREVIOUS ANSWERS**OSCOLPHYS2016ACC 3.4.P.046.**

MY NOTES

ASK YOUR TEACHER

PRACTICE ANOTHER

**question**

A basketball player is running at 5.40 m/s directly toward the basket when he jumps into the air to dunk the ball. He maintains his horizontal velocity. (For each answer, enter a number.)

(a)

What vertical velocity (in m/s) does he need to rise 0.650 meters above the floor?  
  m/s

(b)

How far (in m) from the basket (measured in the horizontal direction) must he start his jump to reach his maximum height at the same time as he reaches the basket?  
  m

#### 8.

Suppose a soccer player kicks the ball from a distance 25 m toward the goal. Find the initial speed of the ball if it just passes over the goal, 2.4 m above the ground, given the initial direction to be 30° above the horizontal.

21.41  m/s

#### 9.

An object of mass 0.77 kg is initially at rest. When a force acts on it for 2.9 ms it acquires a speed of 11.3 m/s. Find the magnitude (in N) of the average force acting on the object during the 2.9 ms time interval. (Enter a number.)  
  N

**10.**

**[3/3 Points]**DETAILSPREVIOUS ANSWERS**OSCOLPHYS2016 4.4.WA.022.**

MY NOTES

ASK YOUR TEACHER

You hold your physics textbook in your hand. (Assume that no other objects are in contact with the book.)

(a)

Identify the forces acting on the book. (Select all that apply.)

book on hand

hand on book

floor on book

earth on book

(b)

For each force you identified in part (a), indicate the direction. (If a force is not applicable, choose NA.)

book on hand   

hand on book   

floor on book   

earth on book   

(c)

Identify the forces acting on your hand. (Select all that apply.)

book on hand

hand on book

floor on hand

earth on hand

(d)

For each force you identified in part (c), indicate the direction. (If a force is not applicable, choose NA.)

book on hand   

hand on book   

floor on hand   

earth on hand   

(e)

Identify the forces that form the action-reaction pair as defined by Newton's third law.

earth on hand    

hand on book    